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Informational Externalities of Going Public Decisions

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INFORMATIONAL EXTERNALITIES OF GOING PUBLIC DECISIONS

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DEDICATION

This dissertation is dedicated

with love to

Joseph.

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ABSTRACT

In this dissertation I examine the informational externalities of going public decisions for industrial and banking sector. The results show that industrial rivals have positive valuation effects only in response to venture backed IPOs and no significant reaction in response to non-venture backed IPOs. I also find evidence that the effect on rival firms is stronger if they operate in low concentrated industries (i.e. high competition) and have low growth opportunities. The relative size of IPO firm seems to play an important role in the direction and magnitude of industry rivals' valuation effects. Negative information revealed in the form of downward price revisions adversely affect rival firms' valuation. Positive information is also conveyed at the IPO announcements in banking industry. Bank rivals experience wealth gains if they are headquartered in the same state and no valuation effects if they are headquartered in the same region as the announcing bank. However, positive and significant reactions are noted in Mid-Atlantic and Southwest regions and negative reaction in Midwest region. Overall, these findings confirm that IPOs convey valuable information to the market and investors use this information to reassess the value of the rival firms.

CHAPTER I

INTRODUCTION

The initial public offering of equity is probably the most important information event in the life of a firm. A going public firm must provide a broad set of information about its prospects and performance and, as a result, it receives information from investors during the book-building phase.

Although the information content of initial public offering announcements cannot be computed for IPO firms, theoretical models of going public decisions predict positive informational externalities on potential issuers (privately held firms) within the same industry. Subramanyam and Titman (1999) show that going public firms generate positive externalities by increasing the size and informational efficiency of the stock market, creating a "spillover" effect for other firms to go public. Benveniste, Busaba and Wilhelm (2002) demonstrate that informational externalities of IPOs imply a learning process in a sequence of related IPOs. The benefit of IPO externality is higher among early followers.

If initial public offering announcements reveal valuable information for potential issuers related by a common valuation factor, it is likely that investors in similar publicly traded firms use this information to reassess the value of their own firms' future prospects. Therefore, initial public offering announcements are likely to have externality effects for rival firms (i.e., publicly held firms within the same industry). I address this issue, i.e., externality effects of initial public offerings on the rival firms, in this dissertation.

An important motive for examining this issue stems from the fact that two opposing theories on externalities predict conflicting results regarding the effect of an IPO on rival firms. An IPO, on one hand, might signal a change in industry's outlook (i.e. future growth opportunities) and therefore, bring about positive valuation effects for rival firms. On the other hand, the decision to go public might cause a reassessment of the competitive situation within the industry. Since the IPO firm raises equity funds that can be used to expand in the product market and compete more efficiently, rival firms may lose some of their market share. Therefore, this possibility predicts negative valuation effects for rival firms.

Only a limited amount of work exists regarding the impact of IPO announcements on rival firms. Melvin and Valero-Tonone (2003) examine the impact of U.S. cross-listing shares (ADRs) on home-market rival firms. Since foreign firms list their shares for the first time in U.S. and typically the listing is accompanied by raising equity, they can be viewed as IPOs with potential information effects transferred to home-rival firms. The results show that rivals are hurt by the listing of other firms in their industry. The result suggests that listing on US exchanges enhances the ability of a cross-border firm to take advantage of growth opportunities not available in its home country.

Slovin, Sushka and Ferarro (1985) find that rivals react negatively to equity carve-out (non-traditional IPO) announcements. They interpret this result as unfavorable information about industry prospects conveyed by equity carve-outs to industry rivals. They further show comparable effects on rivals by firms that undertake traditional IPOs (107 firms). However, they do not examine the event specific characteristics and industry or firms' characteristics that might explain the diverse rivals' reaction across industries.

Akhigbe, Borde and Whyte (2003) examine whether an industry effect exists for initial public offerings. Their results show that IPO announcements are firm specific events, with no information transferred to industry counterparts. They interpret this result as offsetting information and competitive effects. However, caution needs to be exercised when interpreting the results reported by Akhigbe et al. First, they do not separate the impact of venture capital backed from non-venture backed IPOs. Second, the authors pool all the IPOs in the sample without considering the difference in information structure between industrial and non-industrial firms. Finally, they do not control for confounding events pertaining to rival firms around IPO announcements that could potentially contaminate the rivals' stock price reaction around these announcements.

There are two reasons why this analysis should be partitioned on industrial firms and non-industrial firms. First, Diamond (1984, 1991) and Ramakrishnan and Thakor (1984) show that information structure of banking firms is different than that of industrial firms. Slovin, Sushka and Polonchek (1992) test this theory for seasoned equity and find that a bank public announcement generates external information effects on other banks to an extent not found in industrial sector. A bank decision to go public might not be entirely a voluntary action as it is for unregulated, industrial firms, but it reflects private information held by managers and regulators about bank's capital and the value of its loan portfolio. Second, the regulatory environment for utility and banking industries creates less diversity across firms. Kohers (1999) shows that intra-industry information transfer is more pronounced in homogeneous industries, because investors have higher propensity to draw inferences from public corporate events.

There are two main contributions in this dissertation. First, by examining the impact of venture backed IPOs versus non-venture backed IPOs on industry counterparts, this study

distinguishes between the information content and intra-industry information transfer between the two subgroups. Second, the separation between the industrial and banking firms that went public is crucial due to the difference in information structure of banking firms and the potential for higher externalities effects on other banks.

The results show that rivals in industrial sector experience positive and significant abnormal returns in response to venture backed IPOs and no significant reaction in response to non-venture backed IPOs. This is consistent with the hypothesis that venture-backed IPOs signal positive industry prospects and the information revealed has industry-wide implications. Another important result is that rivals with high market-to-book value experience positive and significant valuation effects in response to venture backed IPOs and low market-to-book value rivals have negative and significant valuation effects in response to non-venture backed IPOs. This implies that high market-to-book rivals have the ability to incorporate future growth opportunities available within an industry when this information is signaled at the filing date. On the other hand, low market-to-book rivals that operate in low concentrated industries may have a competitive disadvantage when a non-venture backed IPO firm enters, probably because the newly public firm may be more technologically advanced than its rivals are.

Bank IPOs generate higher externalities than industrial IPOs. Regardless of bank rivals' location (same state/region), they experience positive abnormal returns in response to an announcing IPO in the same state/region. This is consistent with Kohers (1999) who shows that the presence of regulation creates less diversity across banking firms and therefore, investors have higher propensity to react in response to public bank announcements. Within regional bank reaction, two regions experience a higher externality effect: the Mid-Atlantic region and the Southwest region. I interpret this result as rival banks having a higher opportunity to expand by

acquiring a newly publicly traded bank in their region. This is consistent with the inter-state acquisition and consolidation activity after 1997 as a result of branching deregulation Act of 1994.

This dissertation proceeds as follows. Chapter II discusses relevant literature. Chapter III examines IPO externalities on rivals of industrial firms, while Chapter IV studies the same for banking firms. Chapter V provides summary and concluding remarks.

CHAPTER II

LITERATURE REVIEW

The last two decades have seen an active market for initial public offerings of equity securities in the United States. In keeping with this renewed interest in IPOs, a substantial amount of theoretical and empirical work has been undertaken in recent years on various issues pertaining to the IPO decision. These issues include rationale for going public, IPO underpricing, allocation of shares in an IPO and reasons for the long run post-issue underperformance. Below, in light of my dissertation objectives, is the literature review, focusing primarily on theoretical arguments that have been advanced in explaining the going public decision

2. 1. Theories of going public

The going public decision and its consequences have become an interesting theoretical issue in recent years. Ritter and Welch (2002) classify the theories of going public in two groups: life-cycle theories and market timing theories.

2.1.1. Life Cycle Theories

Zingales (1995) models the first theory of going public decision focusing on the role of an initial public offer (IPO) in maximizing the proceeds the initial owner can obtain in selling the company. He further argues that an IPO facilitates a potential takeover, being much easier for a potential acquirer to target a company when it is public. Zingales argues that when management gets private benefits from corporate control, the going public decision helps increase the bargaining power of the initial owner relative to potential buyer, allowing to extract a higher value from the buyer.

Chemmanur and Fulghieri (1999) develop a model of going public decision of a firm focusing on three essential differences between public and private firms. First, public firms have a more dispersed ownership, which implies that equity holders in public firms are much better diversified than those in private firms. Second, raising capital in public market implies that a large group of investors must be convinced about the quality of the firm's projects. In equilibrium, the cost incurred by outside investors to become informed is borne by the going public firm, in the form of underpricing (setting a lower offer price). Third, when a firm goes public, its share price becomes public information. This implies that many unsophisticated investors who free ride on the information they infer from observable stock price reduce the magnitude of the cost of outsiders' evaluation about firm's projects. The primary prediction of Chemmanur and Fulghieri's model is that going public decision depends on the stage of firm's lifetime. In early stage, it is optimal to remain private since there is a high information cost; however, if the firm grows large enough, going public becomes the optimal equilibrium.

Maximovic and Pichler (2001) study a setting in which the firm's IPO conveys valuable information to competitors in the product market. The timing of the going public decision trades

off this disincentive of going public with the potential advantages of expanding early in the product market using the capital raised at the IPO. A public offering creates a secondary market for the firm's securities, which reveals valuable information about the new technology to potential rivals. Potential rivals condition their entry decision on this information, thus reducing the excess or insufficient entry. In this setting, a pioneer firm in an emerging industry faces both technological risk and new-entry risk when goes public. Therefore, the timing and the choice of financing depend on the public perception that the industry is viable, probability that a superior technology may appear, and potential rivals' cost of entry (i.e., cost of research and development paid for existing/ new technology).

Maximovic and Pichler's model predicts both the timing of IPOs and the success of IPOs in the short- and long run horizon. For example, early public financing is predicted in industries perceived to be viable, in which there is a low probability of being displaced by more technologically advanced rivals. In industries where the new entry risk is significantly high, the herding of IPOs is predicted. This means that the first public offering in an industry will cause other firms to go public around the same time. In contrast, if the technology risk is the most significant one, then the industry may be able to support only a small number of IPOs. If they are not the first, or second, they will have to wait until the uncertainty about the new technology is resolved.

2.1.2. Market Timing Theories

The information asymmetry model developed by Lucas and McDonald (1990) predicts that firms postpone their equity issue if they are currently underpriced. Therefore, if the firms' market values are too low, they will delay their IPOs until the market offers favorable pricing. Consistent with this prediction, firms avoid going public when few other good-quality firms issue equity (Choe, Masulis and Nanda, 1993).

Another theory argues that public markets provide valuable information to entrepreneurs. Subrahmanyam and Titman (1999) study a setting in which outside investors may obtain information, unavailable to firm insiders, which is useful in making investment decisions. When two investors expend the same resources on information collection, they may receive correlated but different signals. In this case, the public market generates better information than a private financier. One important aspect of information acquisition is the role of serendipity, i.e. stock market investors may receive valuable information (with some noise) by chance, without any cost. The diverse serendipitous information can provide a useful signal that could not have been obtained if the firm were privately financed. When the role of serendipitous information is strong, this creates incentive for additional investors to become "active" ones, making it more attractive for firms to go public ("spillover effect"). By going public, firms generate positive externalities by increasing the size and informational efficiency of the stock market. The main prediction of the information-based model of going public is that it generates higher benefits in large, liquid markets. This implies positive externalities associated with going public decision, moving the economy from an "inferior" equilibrium with few firms publicly traded to a "superior" equilibrium in which many firms go public. The above prediction contrast with that of Chemmanur and Fulghieri's (1999) model in which the main advantage of going public is that

public financing is cheaper than private financing because public investors can diversify their portfolios.

The latest theory of going public deals with information learning over a sequence of IPOs. Benveniste, Busaba and Wilhelm (2002) model the frictions that pioneering firms face when they access public market. Going public produces information that influences production decisions of their potential rivals (Persons and Warther, 1997). The externality created by the pioneering firm is beneficial to potential entrants, because they costlessly learn about the outcome of the pioneer (underpricing level, offer withdrawal, price revisions). Conditional on the pioneers' experience, followers decide whether to go public or not, leading to inefficiency associated with underinvestment problem. In Benveniste *et al.* model, followers learn not only about pioneers' outcome but also about the viability of their own investment decisions, conditional on the pioneer's outcome. In a setting in which the pioneering firm decides to cancel the offering because of a weak feedback received from outside investors during book-building phase, the follower may sometimes attempt an IPO. Also, the reverse might happen, when the pioneer's IPO is a success, the follower might decide to remain private. Thus, firms that go public later are able to free ride on the costly information generated by those in the same industries that have gone public ahead of them. To solve this inefficiency, Benveniste *et al.* illustrate how an intermediary can enhance the social welfare by resolving the coordination problem between pioneers and followers. When firms share a common valuation factor (i.e. they are in the same industry), the underwriter can bundle the offerings, forcing the followers to share the cost of the information externality produced by pioneer's IPO. The major prediction of this model is that IPOs tend to be clustered over time and within industries. Consequently, the hot

IPO markets occur if pioneering firms go public only when there is a potential for mitigating the followers' incentive to free ride on the pioneers' costly information acquisition.

The information externalities of IPOs imply a learning process across a sequence of related IPOs, which diminishes over a series of IPOs (i.e., early followers learn more from the pioneer's experience but late followers learn less). This predicts a different pattern of underpricing level for pioneer and its followers. If the offerings are not bundled together, the pioneering firm will have a higher underpricing than that of followers. However, in hot markets, underwriters spread the cost of information across IPOs and thus, the level of underpricing would not be lower for later offerings.

2.2. Empirical evidence of going public decisions

An inherent problem of empirically testing the going public decision lies in determining the sample. In order to select a truly representative sample, a researcher has to be able to identify not only the firms that have gone public but also the firms that have chosen not to. The complexity in identifying the second group of firms makes the task of examining the full implications of going public decision difficult at best. Pagano, Panetta and Zingales (1998) overcome this problem by examining a set of Italian firms that include private firms opting not to go public. One of the findings is a larger than normal turnover of the controlling group, which points to the importance of IPO as a stage in the sale of company, as Zingales (1995) suggests. This change in the structure of ownership could potentially explain the diversification motive in going public decision but, empirically, Pagano *et al*. find that controlling shareholders divest very little at the time of IPO and they even slightly increase their holdings in the subsequent

years. This fact diminishes the role of portfolio diversification as a reason for going public as advocated by Chemmanur and Fulghieri (1999).

Lerner (1994) tests the market timing theory of going public focusing on the biotechnology industry. The industry market-to-book ratio has an important role in the decision to go public rather than to use private financing. Lerner documents a pattern suggesting that companies go public when industry valuations are the highest. This increase in comparable firms' valuation may reflect improvements in growth opportunities. On the other hand, investor sentiment could also play a role in increased valuation. Lowry (2002) shows that investor sentiment and IPO volume are positively correlated. Thus, it is not very clear whether going public decision is driven by high investment opportunities or investor sentiment or both.

The information externalities model (Benveniste, Busaba and Wilhelm, 2002) raised interest to empirically capture some of its predictions. Benveniste, Busaba, Wilhelm and Yu (2003) examine the consequences of clustering in the IPO market, as suggested by Benveniste et al. (2002). The evidence shows that potential issuers (privately held companies) learn from information about a common valuation factor that spills over from their contemporaries (firms attempting IPOs). This information spillover effect is documented, as many IPO firms revise their offer terms during the registration period and even decide to withdraw the offer if information received is not encouraging. Benveniste et al. (2003) explain the clusters of IPOs over time and within the same industry as an institutional response to information externalities. Because information production is costly and becomes public during marketing effort, no firm has the incentive to be a pioneer in an IPO wave. It will be advantageous to wait and go public later when it can observe the outcome from the previous offers. To resolve this coordination problem, the investment banks bundle IPOs related by a common valuation factor. As a result,

there are two effects: a uniform sharing of information production among firms that attempt an IPO and a negative relation between underpricing and subsequent IPO volume among firms subject to a common valuation factor. Information spillover and bundling effects are stronger at the beginning of a sequence of IPOs than later in the IPO wave. Therefore, pioneers experience larger proceeds revisions and higher initial returns compared to followers. Also, depending on the followers' position in the IPO wave, the results show a higher probability of withdrawal and higher initial returns for early followers relative to those of late followers. This result is consistent with Benveniste et al. (2002) in the sense that IPO firms learn from the experience of their contemporaries as well as from their own marketing effort, incorporating all this information in the offering terms proposed in the preliminary prospectus.

The negative relation between initial returns and subsequent IPO volume is a direct consequence of bundling IPO firms subject to a common valuation factor. When total cost of information production is spread across a larger bundle of firms, the initial returns are lower. This finding contrasts with that of Lowry and Schwert (2002), in which they document a positive relationship between IPO volume and initial returns. To correctly interpret these contrasting results, one needs to distinguish between the "hot market" relationship and bundling argument. Bundling leads to lower initial returns, the more offerings subject to a common valuation factor an IPO wave consists of. In a hot market, more positive information in the form of higher expected valuations result in a higher initial returns and more companies filing to go public (Ibbotson, Sindelar and Ritter, 1988, 1994).

Lowry and Schwert (2002) find that the level of initial returns at the time companies file to go public contains no information about their eventual underpricing. Thus, there is no relationship between a company's underpricing and the average level of underpricing known at

the time of filing. This implies that IPO firms do not incorporate the public information available at the time they file a registration with SEC, and thus, they can't influence their underpricing by timing the IPO. The only information that drives the positive relationship between initial returns and IPO volume is the private information revealed during the registration period. The more positive information (upward price revisions), the higher the initial returns and more companies have incentives to go public soon after.

The cycles in initial returns and subsequent IPO volume represent a puzzle for researchers. The main question is why companies file their offerings when average initial returns are high? They could raise more money if they postpone the offerings till the initial returns observed are low. Lowry (2002) shows that fluctuations in IPO volume are related to changes in private firm's demand for capital, changes in adverse selection costs of raising equity and variation in investor optimism. On average, firms tend to go public when private firm's demand for capital is high, adverse selection cost of equity is low and investors are overoptimistic. Loughran and Ritter (2002) use prospect theory to explain the cycles in initial returns. They argue that initial returns are related to public information revealed during registration period, but only partially incorporated in the offer price. The offerings, whose registration periods coincide with periods of high market returns, tend to be underpriced. Because the registration periods of IPO firms that choose to go public in about the same time overlap, this generates cycles in initial returns.

The positive relationship between initial returns and IPO volume suggests that positive information received during registration period drives companies to go public at higher valuations than they had expected. This is consistent with prior empirical results in Pagano et al. (1998) and Lowry (2002) in which companies tend to go public when industry market to book

value is especially high. Assuming that the positive information revealed during the book building phase results in high initial returns and affects other similar publicly traded firms, the average market to book value of rivals should increase. Thus, it is possible that the IPO's registration period may potentially have positive externalities not only on initial returns but also on market valuation of rival firms.

2.3. Intra-industry Information Transfer of Corporate Event Announcements

King (1966) who examines the importance of industry factors in explaining stock returns provides the foundation of intra-industry information transfer research. King finds that in addition to market factors, industry commonality factors explain 10% of the variance of stock returns.

The research of intra-industry information transfer contends that information disclosed by one industry member has valuation effects for its industry counterparts (rivals). The direction of rivals' stock price reactions depends on whether the information released by the announcing firm reflects industry-wide commonalities (*contagion effect*), shifts in competition within the same industry (*competition effect*) or firm-specific information (no valuation effect for rivals).

Volumes of research exist regarding announcement effects of various corporate events. Valuation effects resulting from earnings and management earnings forecast announcements for both the announcing firms and their rivals dominate the 1980’s intra-industry information transfer studies. In 1990s, the information transfer literature has focused on other corporate events, including going private transactions (Slovin, Sushka and Bendeck, 1991), stock repurchases (Hertzel, 1991), seasoned equity/debt offerings (Szewczyk, 1992), dividend changes,

dividend omissions/initiations (Laux, Starks and Yoon, 1998; Kohers, 1999), and stock splits (Tawatnunchai and D'Mello, 2002).

In this section, I present the research in intra-industry information transfer classified in three groups: contagion effect, competitive effect and firm specific information.

2.3.1. Contagion effect:

Using earnings as the information release, Foster (1981) identifies two sources of information transfer effects: industry-wide commonalties type and competitive shift type. He argues: "one possible source of an information transfer arises due to the earnings releases of firm *j* conveying information about the impact of industry-wide commonalties on firm *i* or, about the impact of competitive shifts within the industry for firm *i*". Foster finds evidence of intra-industry information transfer of actual earnings releases from announcing firms to non-announcing firms within the same four-digit SIC code. The direction and magnitude of the earnings releases effect on the announcing firms are determinants of the direction and magnitude of announcement effect on other firms in the industry.

Clinch and Sinclair (1987) re-examine information transfer effects of earnings announcements using a recursive system of equations approach that controls for contemporaneous cross correlation of returns. For a sample of Australian firms, they find evidence consistent with contagion effect of earnings announcements, but the magnitude of price change diminishes for subsequent announcing firms in the same industry. Thus, the timing pattern of earnings releases rejected by Foster (1981) is due to low-power non-parametric test used.

Han, Wild and Ramesh (1989) extend the intra-industry information research by examining the management earnings forecast announcements. Using single- and two-index (market and industry) models to distinguish between market- and industry- commonalties effects, they find positive abnormal returns for both management forecast and non-management forecast firms at the time of the announcements. Further, they show that the non-forecast firms' abnormal returns are unrelated both in magnitude and direction to the forecast firms' abnormal return. Therefore, the intra-industry information transfer associated with manager's forecast is information that reflects industry-wide commonalties and not competitive advantages within industry. Han and Wild (1990) re-examine the intra-industry information transfer, using the unexpected earnings to proxy for the information signal. They find that intra-industry information transfer is not due to covariation in firms' returns only, but also to competitive shifts. Their conclusion contrasts with that advanced in their previous paper in which they find only industry effects, but the dominant effect is the contagion one.

Other corporate events than earnings releases and management-forecast announcements document contagion effect for non-announcing firms. For example, Slovin, Sushka and Bendeck (1991) analyze going private transactions and find that bids to take firms private generate positive abnormal returns for both target firms and their rivals. The sources of rivals' contagion effect could be: private information about expected future cash flow in the industry, a higher probability of subsequent buyout bids for target's rival firms or a potential industry-wide agency problem that may induce managers to improve performance to avoid an outside bid. The magnitude of rivals' reaction is a function of rival size relative to size of the target and buyout specialist participation. The effect on share prices of industry rivals is inversely related to the relative capitalized values of rival firms and target firms and positively related to the presence of

buyout specialist. Slovin *et al.* point out that going private transactions generate positive external information effects for industry rivals, suggesting that shareholders of rival firms gain from costly acquisition of information associated with buyout transactions.

Szewczyk (1992) examines the information effects around corporate securities issues: common stock, convertible securities and straight debt. He hypothesizes that corporate securities offerings generate unfavorable information about the general prospects within an industry. The evidence shows that rivals' reaction is positively correlated with announcing firms' negative abnormal return. This result suggests that investors reassess the value of equity in the industry (contagion effect) rather than it reflects competitive shifts between announcing firms and their industry rivals.

Contrary to Szewczyk (1992), Slovin, Sushka and Polonchek (1992) find no information effects of seasoned equity issues by industrial firms on their industry rivals. In a comparative study, they examine the information externalities of bank seasoned equity issues versus industrial firms seasoned equity issues. They show that information structure of banks, along with bank regulation process, induces investors to interpret bank seasoned equity announcements as negative signals of value for other banks. This finding supports the theoretical models of Diamond and Dybvig (1983) and Gorton (1985) in which asymmetric information impounded in bank asset portfolios leads to information externalities in banking industry. Slovin *et al.* explain this result arguing that a bank decision to issue seasoned equity might not reflect entirely the voluntary action as in the case of industrial firms; it might reflect the private information of managers and regulators about bank's capital and the value of its loan portfolio. Pressures from regulators to increase the bank capital and confidentiality of loan portfolio quality create external valuation effects for other banks around seasoned equity issues announcements.

The intra-industry information transfer of bankruptcy announcements have raised interest in the literature, due to the two opposing effects these events may have on their rivals' equity value. Lang and Stulz (1992) suggest that intra-industry effects are the sum of contagion and competitive effect. The contagion effect is the change in the value of competitors that cannot be attributed to wealth redistribution from the bankrupt firm. Thus, the bankruptcy announcement, in addition to conveying negative information, can decrease the equity value of competitors whose cash flows' characteristics are similar to those of the bankrupt firm. On the other hand, the competitive effect is the wealth gain experienced by the industry rivals, since bankruptcy announcement conveys information about the demand shift. Thus, depending on the level of market concentration, the industry rivals may experience an increase in demand. Also, the rivals' leverage ratio plays an important role in intra-industry information transfer around bankruptcy announcements. Leverage magnifies the contagion effect but not the competitive effect. The results show that high-leveraged rival portfolios experience negative and significant abnormal returns as a response to a bankruptcy announcement, whereas low leveraged rival portfolios have positive but insignificant reaction. Overall, the contagion effect dominates; for the whole sample, rivals lose about 1 percent in equity value. The analysis for the sub-samples demonstrates that in industries with low leverage and low degree of competition, rivals react positively, whereas in industries with high leverage and high degree of competition, competitors lose about 3.2 percent in their equity value.

Firth (1996) finds evidence consistent with intra-industry information transfer around dividend changes announcements. A prior study (Boim, 1977) documents spillover effects in response to Consolidated Edison's decision to pay no dividend in 1974; however, this study is limited to a single event and therefore difficult to generalize. Firth links dividend signaling and

information transfer to test whether dividend change (at least 10 percent relative to stock price) of one firm is associated with change in valuation of other firms within the same industry. He finds small, but significant contagion effects of dividend changes on industry rivals. Information transfer associated with dividend surprises affects earnings forecast of both announcing and non-announcing firms, and this leads to stock price revisions. The magnitude of industry rivals reaction depends upon the degree of dividend surprise, recent dividend history of other non-announcing firms and level of homogeneity within industry (proxied by stock returns correlation between announcing and non-announcing firms). Laux, Starks and Yoon (1998) analyze large dividend revisions (at least 25%) to study the intra-industry valuation effects on non-announcing firms. On average, dividend increases/decreases lead to positive/negative abnormal returns for rival portfolios. However, breaking down the sample in rivals whose Tobin's q is higher (lower) than that of the announcing firm and subsequently divide these samples in those whose Herfindhal Index is greater (lower) than that of the announcing firm, leads to contrasting results. The authors find that dividend revision events lead to two offsetting price effects; for rivals without extensive market power or growth options relative to the announcer, dividend increases elicit no reaction and dividend decreases elicit a negative reaction. Rivals with extensive market power experience positive reaction to dividend increases and no reaction to dividend decreases. In addition, Laux *et al.* find evidence that industry rivals experience changes in dividend yield subsequent to the announcement; this shows that a shift in industry prospects leads to a shift in rivals' ability to pay dividend.

Although the evidence of information transfer related to regular dividend announcement it appears to be clear, the dividend initiation/omission announcements in intra-industry information setting is not conclusive (Howe and Shen, 1998; Impson, 2000). However, Otchere

(2000) documents a contagion effect associated with dividend initiation announcements for a sample of Australian firms. While he finds that there is some evidence of competitive realignment in the industry, the information effects are positive on average for industry rivals (consistent with contagion effect).

Eckbo (1983) estimates the valuation effects to horizontal competitors of target firms around merger proposals to assess whether the rival firms gain from collusion. Under the collusion hypothesis, rival firms benefit from the merger since successful collusion limits output and raises product prices. If rivals remain outside the collusive agreement, the positive reaction still holds since these firms free ride on the higher product price. The collusion argument doesn't necessarily mean that a given merger is indeed anticompetitive. Even though the positive reaction of rival firms is consistent with collusion argument, it can be also consistent with productive efficiency hypothesis. Under this hypothesis, there are two possible offsetting effects: price effect and information effect. The net reaction is the sum of these offsetting effects. First, the intensified competition in product and factor markets results in lower prices for both products and factors. This effect leads to a negative change in the market value of rivals around merger proposal announcements. Second, the news of an efficient merger proposal can signal investment opportunities for the rivals and this leads to increase in rivals' market value around merger proposal announcements.

Overall, Eckbo's findings reveal no significant evidence that the competitors of the merging firms lose value at the time of proposed horizontal mergers. He finds a positive abnormal return for rivals of horizontal mergers, which is consistent with productive efficiency hypothesis (information effect offsets price effect) but also with collusion hypothesis. To shed more light on the true effect that drives the rivals' wealth change around horizontal merger

proposals, Eckbo (1985) examines the role of market concentration (pre- and post- merger) to assess whether a horizontal merger has collusive, anticompetitive effects. The market concentration doctrine predicts that the greater the merger-induced change in industry concentration, the more likely collusive effects a horizontal merger has. It follows that the expected gain for rivals of merging firms is increasing with the concentration change. Eckbo finds evidence that rejects the market concentration doctrine, mainly due to negative relation between the industry wealth effects and merger-induced change in concentration. He argues that the positive industry wealth effects reflect good news concerning opportunities for productivity increases that are available to rival firms in the same industry.

Like Eckbo (1983), Akhigbe and Madura (1999) analyze the market reaction of rival banks in response to bank acquisition announcement. Examining a single industry allows focusing on how event-specific and bank-specific factors affects the intra-industry effects; specifically, Akhigbe and Madura focus on the distribution of valuation effects across bank acquisition announcements and across rival banks within each announcement. The results show a contagion effect (both target banks and their rivals react positively to acquisition announcements). This effect could be explained as bank acquisitions signal valuable information about the probability that rival banks are subsequently acquired or, good prospects for banking industry. The cumulative abnormal return of rivals conditioned on event-specific characteristics are positively related to target bank abnormal return and negatively related to the prior performance of rival banks. Also, the size of target bank and the probability of an individual rival being acquired explain valuation effects of bank acquisitions. The results parallel those of Eckbo (1983) and in addition, show that the valuation of rival banks is influenced not only by characteristics of the event but by their own specific characteristics as well.

The contagion effect is documented also in association with loan loss reserve (LLR) announcements. The information effects of bank LLR decisions have the potential to show whether banks process and signal asymmetric information about credit conditions. Two studies examine the impact of Citicorp's LLR announcement on other money center banks (Musumeci and Sinkey, 1990b; Grammatikos and Saunders, 1990). The former documents significant contagion effect of money center banks in response to Citicorp's decision to increase its reserve allocation. Both Citicorp and its rivals (money center banks) experience positive abnormal returns at the time of the announcement, which can be interpreted as a signal of value-enhancing corporate restructuring. The latter, however, documents no reaction for rivals. Grammatikos and Saunders contend that LLR additions that followed Citicorp's May 1987 LLR announcement contain no new or unexpected LLR information and therefore, there is no intra-industry information effect. Both studies focus on information transfer associated with a single event. Thus, it offers a narrow insight into the contagion effects of money-center banks following LLR announcements.

To shed more light on the existing evidence, Docking, Hirschey and Jones (1997) examine a large sample of LLR announcements to assess whether the market interprets LLR announcements by money center banks differently from those made by regional banks. In addition, they analyze the importance of contagion effects associated with regional bank LLR announcements by considering region-by-region differences in rivals' reaction. The evidence shows significant negative contagion effects for non-announcing money center banks and regional banks following LLR announcements by regional banks. These negative effects are more prominent in New England, Mid-Atlantic and Southwest regions. Surprisingly, there is no conclusive evidence of negative contagion effects following LLR announcements by money

center banks. This parallel Grammatikos and Saunders' finding in which money center bank LLR announcements generate no externalities to either non-announcing money center banks or regional banks. One possible explanation for the lack of contagion effect is the intense analyst coverage and continuos flow of information of money center banks. The negative contagion effects of LLR announcements by regional banks might be explained by market's relative lack of information with respect to the quality of regional bank loan portfolios. That may be why regional bank LLR announcements contain more information than those made by money center banks.

2.3.2 Competition effect:

Saunders and Smirlock (1987) examine the intra-industry information transfer in response to a single event: BankAmerica's entry into discount brokerage business. Despite the absence of a regulatory approval, BankAmerica Corporation announced its intention to acquire Charles Schwab and Company (November 1981) and it became the first commercial banking firm to offer discount brokerage services to its customers. This event had two opposite implications for rival firms: 1) a contagion effect as rival commercial banks would enter the brokerage business, or 2) a competitive effect faced by securities firms resulting from potential loss in market share. The evidence shows that securities firms experience a significant decline in the market value at the time of BankAmerica's announcement. This suggests that securities firms' reluctance to bank entry into discount brokerage was self-motivated. The negative reaction of securities firms in response to this event reflects a significant shift in competition within securities industry, whereas rivals in banking industry (both money center banks and regional

banks) experience no reaction as a result of BankAmerica's intention to acquire a leading discount brokerage firm.

Besley and Kohers (2000) analyze the intra-industry valuation effects associated with private placements of common equity and find negative reaction for rival firms as opposed to positive reaction for issuing firms. The results of this study provide new evidence on the competitive implications of private issues and the strength of the information content associated with private placements. Private financing helps firms to protect valuable information from being disclosed publicly (i.e. potentially profitable projects, new technological developments); thus, information that might be valuable for rival firms, remains private. There are two explanations as to why rival firms react negatively to private placement issues. First, if managers choose private equity placements to prevent disclosure of private information, it is possible that private equity placement might be considered “bad news” for rival firms. This would support theoretical models of Bhattacharya and Chiesa (1995) and Yosha (1995) in which privately placing equity is expected to signal competitive shifts within the industry. On the other hand, if a private equity placement is considered a substitute for a public equity placement, the results would parallel those of Szewczyk (1992), who find that industry rivals experience negative stock reactions. The evidence shows that private placements of equity reflect shifts in competition within the same industry (*competition effect*) rather than industry-wide commonalties (*contagion effect*).

2.3.3 Firm-specific effect

Share repurchase is a corporate event that does not appear to contain information for rivals. The information conveyed by repurchase announcements could be relevant for industry rivals for two reasons. First, the information may reflect competitive shifts in industry (i.e., the

repurchasing firm is a more efficient competitor) and second, it may reflect the industry prospects as a whole (i.e., an increase in demand for industry product). These competing possibilities might lead to offsetting effects, potentially neutralizing the valuation impact of repurchase announcements on rival firms. This might be one explanation for why Hertzel (1991) finds no reaction of industry rivals around share repurchase announcements. Hertzel, however, argues that share repurchase is a firm-specific event (i.e., tax effects, wealth transfer between security holders of repurchasing firm) and as such should not have valuation consequences for rival firms. Hertzel's results support share repurchases being a firm specific rather than contagion or competitive type events.

Akhigbe, Borde and Whyte (2003) present clear evidence that there is no industry effect for initial public offerings. Without separating regulated from unregulated sector, the information associated with initial public offerings is not transferred to industry rivals. The authors interpret this result as offsetting information and contagion effects. For subsamples, however, they document positive and significant information effects associated with IPOs in regulated industries and the first IPO in the industry. Significant negative competitive effects are associated with relatively large IPOs in highly competitive industries, those in risky industries and those in technology sector.

Slovin, Sushka and Polonchek (1992) examine the information externalities of seasoned equity offerings by industrial firms and banks. Because banks and industrial firms have different information structure, they hypothesize significant differences in the intra-industry effects of adverse managerial signals by banks versus industrial firms. Contrary to Szewczyk (1992), Slovin *et al.* find that while seasoned equity announcements by banks yield valuation consequences for rivals, the same result does not hold for industrial firms. This suggests that

industrial firms' equity issues convey only firm-specific information, whereas banks' equity issues have information externalities for rival banks.

CHAPTER III

INFORMATIONAL EXTERNALITIES OF GOING PUBLIC DECISIONS: EVIDENCE FROM INDUSTRIAL SECTOR

3.1. Introduction

Prior studies document positive informational externality effects of IPOs on potential issuers related by a common valuation factor (Subramanyam and Titman, 1999; Benveniste, Busaba and Wilhelm, 2002). The information revealed at the time firms file their prospectus with the SEC as well as the additional information revealed during bookbuilding phase, has a significant impact on potential issuers that operate in the same industry. Potential issuers condition their decision to become publicly traded companies depending upon the outcome of their contemporaries (the probability of withdrawal, price revisions, underpricing). Benveniste, Busaba, Wilhelm and Yu (2003) show that firms attempt to go public when positive information spills over from previous IPOs (i.e. lower underpricing).

If initial public offering announcements reveal valuable information for potential issuers related by a common valuation factor, it is likely that investors in similar publicly traded firms use this information to reassess the value of their own firms' future prospects. Therefore, initial public offering announcements are likely to have externality effects for rival firms within the same industry.

In this study I expand the current research by examining the informational externalities of going public decisions by industrial firms on existing publicly traded firms within the same

industry (rivals). As I mentioned in Chapter 1, the information structure of industrial firms is different from that of banking firms (Diamond, 1984, 1991 and Ramakrishnan and Thakor, 1984); therefore, the impact of IPO announcements on rival firms should be partitioned on industrial firms and non-industrial firms.

The motivation to consider the informational externalities of going public decisions is twofold: first, when a firm goes public it signals a change in industry's outlook as a whole (i.e. future growth opportunities). Not only is there a substantial change in the size of the IPO firm but also a change in investment opportunities available in a specific industry. Second, the entrance of a new player, with more funds available to invest in growth opportunities, can change the competitive situation within an industry. Lang and Stulz (1992) analyze the rivals' reaction to bankruptcy announcements and show that a competitor's exit from a highly concentrated industry makes rivals better off. In case of an IPO, rivals could be worried about being displaced by a more competitive rival; hence an IPO announcement could potentially make rivals worse off.

In this study, the major hypothesis is that going public firms generate significant informational externalities on rival firms in the same industry around IPO announcements. On average, the results show that there is a positive valuation effect for rivals which seems to indicate that going public decisions signal positive industry prospects (i.e. future growth opportunities). However, when the sample is partitioned into venture backed IPOs and non-venture backed IPOs, rivals have positive valuation effects only in response to venture backed IPOs and no significant reaction in response to non-venture backed IPOs. I also find evidence that the effect on rival firms is stronger if they operate in less concentrated industries (i.e. many competitors) and have low growth opportunities. The relative size of the IPO firm seems to play

an important role in the direction and magnitude of industry rivals' valuation effects. Surprisingly, rivals experience larger wealth gains in response to a relatively larger entrant within the same industry. Negative information revealed at the offering date in the form of downward price revisions has a negative impact on rivals' valuation. In spite of a downward price revision, an IPO firm may not withdraw the offer probably because it wants to expand early in the product market, posing a threat to rival firms.

3.2. Hypotheses

3.2.1. Intra-industry information transfer around IPO announcements

Previous literature has shown that various firm-level announcements have implications for rival firms. If the information disclosed has industry-wide implications, then rival firms experience contagion effects (the direction of rivals' abnormal returns is the same as that of the announcing firm). If the information revealed has competitive implications, rival firms' abnormal returns have opposite direction than that of the announcing firms. Finally, information pertaining to some corporate events is firm specific; therefore, there is no spillover or competitive effect on rival firms.

If the information disclosed by IPO firms at the time they file with SEC has externality effects as suggested by theoretical studies, then investors in similar companies use this information to evaluate the value of their own firms' future prospects. Therefore, IPO announcements are likely to affect stock prices of rival firms, thus having an industry-wide implication. To test whether information conveyed by IPO announcements has an impact on the equity value of rivals, I hypothesize that:

H1: An IPO announcement has a significant valuation impact on rival firms.

The rivals' reaction to IPO announcements can be either positive or negative depending on how investors use the information revealed to make inferences about non-announcing firms' future prospects. However, the positive and negative reactions are not mutually exclusive. Thus, the rivals' reaction to IPO announcements is the sum of these two opposing effects. Either a significant positive or a negative net effect indicates that IPO announcements reveal information that has industry-wide implications.

3.2.1.1. The positive reaction prediction

According to market timing hypothesis, firms have the propensity to go public when industry market-to-book ratios are especially high (Lerner, 1994). Also, Lowry (2002) shows that high IPO volume occurs when private's firm demand for capital is high, adverse selection cost of equity is low and investors are overoptimistic. If going public decision signals positive industry prospects (i.e., future growth opportunities), the average market to book value of the already publicly held firms should increase. Thus, it is possible that going public decisions may potentially have positive externalities on market valuation of similar public firms.

3.2.1.2. The negative reaction prediction

Macsimovic and Pichler (2001) explore a setting in which the going public decision conveys valuable information to competitors in the product market. By raising capital in the IPO to expand a new technology, firms may convey strategic comparative advantages within industry, and therefore, competitors face the probability of being displaced by a more technologically advanced rival. This implies that rival firms should react negatively at the time

of the IPO announcements. An even clearer negative reaction prediction stems from the signaling product quality at the time of IPO (Stoughton, Wong, and Zechner, 2001). By offering to sell stock in their firm, entrepreneurs are stating that they believe the firm has high quality products. When an IPO is announced and a prospectus is released, sensitive information regarding the firm and its industry is published. As the stock price rises, favorable publicity surrounding the firm improves consumers' perception of the quality of the firm's products. As consumers increase their product purchases, the stock price responds favorably, increasing the profits of the firm. The stock prices of competitors can fall when a new IPO is announced if new information conveys more positive prospects for the issuing firm than for the growth of the industry.

3.2.2. Venture backed IPOs vs. non venture backed IPOs

Venture capital firms specialize in collecting and evaluating information of start-up and growth companies, which are more likely to be prone to information asymmetries and capital constraints. Because venture capitalists firms have access to top tier investment bankers (Megginson and Weiss, 1991), venture capital firms may partially overcome the information asymmetry associated with start-up and growth companies and thus, a venture capital backed firm will be less dependent on its internally generated funds. Also, venture capitalists are successful in timing the decision to take the companies public (Lerner, 1994). A venture-backed company goes public when its valuation is at the absolute, short-run peak and when the industry valuations are highest. By successfully timing the IPO, venture capitalists derive significant benefits, even though they rarely sell shares at the time of the offering. Taking companies when equity values are high minimizes the dilution of the venture investor's ownership stake. Brav and Gompers (1997) show that, venture backed IPO firms perform better than non-venture backed

IPO firms, and the market incorporates these expectations at the time of going public. Therefore, a venture backed IPO signals superior information to the market than a non-venture backed IPO. Ivanov (2004) shows that venture backed IPOs have significant higher underpricing than non-venture backed IPOs and the valuations do not change much in the long run (five years after IPO). Consistent with Brav and Gomper's (1997) findings, venture backed IPOs perform better in the long run the non-venture backed IPOs. Also, a significant portion of venture capitalists consists of corporate venture capitalists that have valuable industry expertise. When they bring companies public, the certification role played by venture capitalist may explain why investors are willing to pay more for venture backed IPOs. However, this higher undepricing represent a real cost for venture capitalists, since they rarely sell shares in the IPO. Lee and Wahal (2003) show that the difference in underpricing between venture backed and non-venture backed IPOs (6.2%-9.5%) represent a wealth transfer from venture capitalists to new shareholders. As a compensating benefit associated with incremental undepricing of venture backed IPOs, they document a positive relationship between the level of undepricing and future inflows of capital to venture capital firms. Thus, the "grandstanding" behavior documented by Gompers (1996) explains the costs that venture capitalists are willing to bear in taking their portfolio companies public. Overall, the recent empirical findings suggest that venture backed IPOs signal superior information to the market relative to non-venture backed IPOs.

One important prediction derived from signaling and timing ability of venture capital firms at the time they go public is that industry rivals will react differently to IPO announcements, depending on whether the IPO is venture backed or not. Therefore, I hypothesize that:

H2: A venture backed IPO, compared to a non-venture backed IPO has higher valuation effect on rival firms.

3.2.3. Relative size of IPO firm

The bigger the size of the IPO firm relative to the industry, the more information an IPO is expected to convey. The larger the relative size of IPO firm, the greater the impact on industry rivals' reactions. To examine whether the relative size of IPO firm has a differential impact on stock price responses of industry rivals, I compute the relative size of IPO as the ratio of IPO firm's total assets to industry rivals' total assets within the same four-digit SIC code. This measure is more appropriate than IPO proceeds, since the size of IPO is related to the size of industry rivals. To test whether the relative size of IPO firm has a differential impact on industry rivals, I hypothesize that:

H3: The larger the relative size of IPO firm, the greater the valuation impact on the rivals.

3.2.4. Intra-industry reaction and rivals' specific characteristics

The impact of IPO announcements is not expected to be the same for all firms in the same industry. Rather, the differences in firm characteristics (for example, rival's size, its ability to take advantage of the future growth potential, and whether it belongs to a concentrated industry, etc) will dictate the direction and magnitude of rivals' reaction in response to IPO announcements.

3.2.4.1. Rival firm size:

Atiase (1985) argues that information production and dissemination are positive function of firm size. Thus, the expected change in valuation induced by public announcements should be inversely related to firm size. Atiase reports evidence consistent with this argument in that there is a larger share price reaction to earnings announcements for small firms relative to that of large firms. Also, Slovin, Sushka and Bendek (1991) find that industry rivals' excess returns generated by announcements of going-private transactions are a function of rival size relative to size of the target. To test whether abnormal returns of rival firms generated by IPO announcements vary, depending upon the rival's size, I hypothesize that:

H4: The smaller the size of the rival firm, the greater the valuation impact associated with an IPO announcement.

I classify rival firms based on whether their size is greater (lower) than industry median. The intra-industry effects should be greater (smaller) for relatively smaller (larger) rival firms.

3.2.4.2. Rival market-to-book ratio

Market-to-book ratio is a common proxy for growth opportunities. Rivals' growth opportunities may influence their ability to respond to the competitive threat of a new publicly traded firm within an industry or to incorporate new growth opportunities available in that industry.

If IPO announcements signal positive prospects for industry (i.e. future growth opportunities), then rivals with high market-to-book ratios are likely to react more positively than those with low market-to-book ratios. On the other hand, especially in less concentrated

industries where competitive shifts in market shares might take place, low market-to-book ratio rivals may not have the ability to respond to the competitive threat of a new publicly traded firm with greater resources. Therefore, I predict a more positive reaction for rivals with high market-to-book ratios than that of rivals with low market-to-book ratio and a negative reaction for rivals with low-market-to-book ratios that operate in low concentrated industries. To test whether the rivals react differently in response to IPO announcements, I hypothesize that:

H5: If the IPO signals brighter industry prospects, the higher the market-to-book ratio of rival firm, the greater the valuation effect associated with an IPO announcement. If the IPO signals comparative advantage information, the lower the market-to-book ratio of rival firm, the lower the valuation effect associated with an IPO announcement

I compute the market-to-book ratio as market value of equity plus book value of liabilities divided by book value of total assets. Within each industry, I classify rival firms as high (low) market-to-book ratio firms if their market-to-book ratio is above (below) industry median.

The fifth hypothesis predicts that there is a positive relationship between the rivals' ability to take advantage of growth opportunities (or to respond to a competitive threat) and their reaction at the IPO announcements.

3.2.4.3. Industry concentration

Stoughton, Wong, and Zechner (2001) explore the second most cited motivation for a firm's decision to go public, namely, the product market motive. The argument used to model the going public decision is based on the interaction between information generated by investors and analysts of a publicly traded firm, on the one hand, and consumers who discern product quality from the stock price, on the other hand. The model predicts that only better quality firms will go

public. Therefore, going public announcements provide a signal to consumers that the IPO firm has a high quality product. This has a negative impact on rivals' profits, since they charge lower prices. The product market explanation of going public decisions is relevant especially in industries where the competitive dynamics play a major role for long term success of companies.

Generally, announcing an IPO conveys bad news for competitors in less concentrated industries, since the announcement might signal higher product quality to consumers and, thus, lowers the price the competitors can charge for their products/services. This prediction suggests that an IPO announcement in low concentrated industry is likely to reveal unfavorable information for its competitors leading to shift in comparative advantages for non-announcing firms. To test this implication, I hypothesize that:

> *H6: There is a positive relationship between the level of industry concentration and rivals' abnormal returns. Thus, the higher the level of concentration in the industry, the higher the valuation effect for the rivals associated with an IPO announcement.*

The Herfindahl Index (HI) is the most used measure of concentration in the industrial organization literature. HI is computed as the sum of squared market share of each firm relative to all other firms within the four-digit SIC code. Market share is defined as the firm's annual sales at the end of fiscal year prior to the IPO announcement divided by industry sales.

3.2.5. IPO price revisions and the valuation impact on rivals

The process of going public is a two-way information channel: the IPO firm reveals valuable information about its prospects and performance at the filing date and receives information from informed investors during the registration period known as book-building

phase (Benveniste and Spindt, 1989). With bookbuilding, typically, a preliminary offer price range is set when firms file their prospectus with SEC. Then, underwriters and issuers market the offer to prospective investors. If there is a strong demand for the IPO, underwriter will set a higher offer price relative to mid file price. The difference between offer price and mid file price range represents the price revisions. Upward/downward price revisions depend on the investors' demand for IPO and also the underwriter's willingness to keep underpricing within reasonable limits (i.e. "leaving less money on the table").

Lowry and Schwert (2002) explain the positive relation between initial returns and subsequent IPO volume as a consequence of information learned during the registration period. Positive information (upward price revisions) learned during an IPO's book-building phase results in a high initial return and, consequently, a higher market-to-book value for the IPO firm. If additional information revealed during book building affects not only the initial returns for the offering but also the subsequent volume of public offerings in the same industry, it implies valuation effects for similarly publicly traded firms. In other words, investors in similar firms use this information to reassess the value of their own firms' future prospects when they observe upward/downward price revisions. To test whether IPO price revisions have valuation effects on rival firms, I hypothesize that:

H7: Rivals experience positive (negative) wealth effects when an IPO undergoes an upward (downward) price revision on the offer date.

3.3. Data and Methodology

3.3.1. Sample Selection

In this study I examine the rivals' share price reactions in response to IPO announcements by industrial firms for 1983-2001 period. The list of IPOs comes from Thompson Financial Security Database (SDC-Global Issue Database). In addition to the filing date and issue date, SDC also reports many aspects of the IPOs, such as: offer price, filing price (low, high, mid), venture backed IPOs, non-venture backed IPOs, etc.

SDC database contains 6,423 IPOs by industrial firms for the 1983-2001 period. I exclude the following IPOs: rights issue (1), unit IPOs (925), foreign IPOs (2), IPOs with offer price less than $5[1] (319) and IPOs not identifiable in the CRSP database. This step reduces the sample to 5,176 IPOs.

The final sample for industrial firms is constructed in a three-stage process as described below. In the first stage, I require that each IPO firm to have available financial information in the Compustat database (total assets, total liabilities, and shares outstanding) in the first year of listing. This allows me to compute size, growth options and relative size of IPO firm, since the IPO proceeds is not always a good proxy for the IPO firm size. This criterion reduces the sample to 3,810 IPOs.

In the second stage, the sample is further reduced when I construct the sample for new firms. In so doing, I follow three steps. First, I assign each firm for which daily stock returns are available on the CRSP files to a four-digit SIC code (see Lang and Stulz, 1992). I exclude IPOs that are in their first year of listing. Second, I construct a list of rival firms that do not have a major public announcements such as mergers, seasoned equity offerings, stock splits, dividend

[1] Benveniste, Busaba, Wilhelm and Yu (2003), Lowry and Schwert (2004), etc eliminate all IPOs whose offer price is $5 or less.

and repurchases around IPO announcements (30 day period centered at the IPO filing date). Finally, to ensure that each IPO firm is matched with a representative portfolio of rivals, I require that each IPO has at least 5 rivals (same industry, same year), with required financial data (total assets, sales, total liabilities) available in the Compustat database.

The final sample of IPOs consists of 1,681 IPOs, with 38,791 rivals in 290 different four-digit SIC codes.

3.3.2. Descriptive statistics

Table 1 presents the frequency of IPOs across years. There are 563 venture backed IPOs and 1,118-non venture backed IPOs for 1983-2001 period. The bulk of IPOs (40% of the sample) occurs during 1992-1997 period. Table 2 reports descriptive statistics of selected variables for IPO sample: proceeds, market-to-book ratio, and total assets. The median proceeds raised by venture-backed IPOs is $30 million, compared to $26 million of non-venture backed IPOs. In 12 out of 19 years, the median proceeds raised by venture-backed IPOs are greater than those of non-venture backed IPOs. The median market-to-book ratio of venture backed IPOs is 2.4, whereas that of non-venture backed IPOs is 1.8. The full sample of IPOs has a median market-to-book ratio of 2.0 and median total assets of $62 million, which are similar to those reported by Akhigbe et al. (2.05 and $50.36 respectively).

Table 3 describes the selected variables for rivals' sample. A total of 38,791 rivals were identified for the sample period in 290 different SIC codes. The exact composition of rival portfolios varies with the timing of the event. The average number of rivals per IPO event is 28.83, the median is 17, the minimum is 5 (to ensure a well representative portfolio of rivals) and the maximum is 408.

Table 1

Frequency of IPOs across years

The sample consists of all IPOs by industrial firms during the 1983-2001 period that satisfy the following criteria: (a) firms have financial data on Compustat during 1983-2001 (both active and research); (b) there are at least five rival firms within the same four-digit SIC code for any given IPO event; (c) the offer price is at least $5 and information about filing price range exists in SDC. The final sample consists of 1,681 IPO events; of these, 563 are venture backed IPOs and 1,118 are non-venture backed IPOs.

Year	Venture Backed IPOs	Non Venture Backed IPOs	Total
1983	35	62	97
1984	16	42	58
1985	19	52	71
1986	35	69	104
1987	20	76	96
1988	14	27	41
1989	17	24	41
1990	22	23	45
1991	29	38	67
1992	58	55	113
1993	57	76	133
1994	27	98	125
1995	29	71	100
1996	52	103	155
1997	36	100	136
1998	15	79	94
1999	32	55	87
2000	39	40	79
2001	11	28	39
Total	**563**	**1,118**	**1,681**

The market-to-book ratio is the ratio of market value of equity plus book value of total liabilities to book value of total assets. Total assets and sales are end-of fiscal year values from Compustat database. The median rival firm has $68.95 million in total assets, $69.37 million in sales and a market to book ratio of 1.54. Akhigbe et al. report a median market-to-book ratio of 1.1 and a

Table 2
Descriptive statistics for IPOs sample

The sample consists of all IPOs by industrial firms during the 1983-2001. To enter in the sample, the following criteria are required: firms have financial data on Compustat during 1983-2001 (both active and research), there are at least five rival firms within the same four-digit SIC for any given IPO event and the offer price is at least $5 and information about filing price range exists in SDC. Market value is computed as market value of equity plus book value of total liabilities. Market/Book is the ratio of market value to total assets.

	Non-Venture Backed IPOs				**Venture Backed IPOs**				**Full Sample**			
Year	*N*	*Proceeds*	*Market/ Book Value*	*Total Assets*	*N*	*Proceeds*	*Market/ Book Value*	*Total Assets*	*N*	*Proceeds*	*Market/ Book Value*	*Total Assets*
		Medians				Medians				Medians		
1983	62	13.4	1.8	31.9	35	15.3	2.5	26.9	97	14.9	2.0	29.0
1984	42	7.8	1.5	23.6	16	12.0	1.9	33.7	58	8.6	1.6	27.9
1985	52	11.7	2.1	30.7	19	15.2	1.8	34.4	71	13.0	2.1	33.5
1986	69	12.0	1.7	31.7	35	14.9	2.1	34.6	104	12.2	1.8	31.9
1987	76	15.1	1.5	47.6	20	17.6	1.7	41.3	96	16.5	1.5	45.6
1988	27	17.2	1.8	69.7	14	15.9	2.5	44.9	41	16.5	2.3	57.7
1989	24	20.9	1.5	113.0	17	15.2	2.3	36.7	41	19.6	2.0	62.2
1990	23	22.5	1.3	54.8	22	24.6	1.9	66.4	45	24.2	1.5	62.7
1991	38	24.9	1.7	87.8	29	32.5	2.8	65.3	67	29.0	2.2	75.6
1992	55	34.4	2.0	75.2	58	32.1	2.4	61.8	113	33.4	2.1	69.9
1993	76	22.7	1.9	70.8	57	27.0	2.0	56.1	133	25.2	2.0	64.9
1994	98	22.5	1.8	44.0	27	17.6	2.3	38.6	125	22.4	1.8	43.7
1995	71	31.5	2.3	75.1	29	33.6	2.7	63.8	100	33.5	2.3	66.6
1996	103	31.9	2.4	58.8	52	43.0	2.5	68.0	155	33.6	2.4	63.2
1997	100	29.0	2.1	67.7	36	35.9	3.8	65.3	136	32.8	2.3	67.6
1998	79	55.3	1.5	152.4	15	35.0	1.9	66.8	94	49.5	1.7	105.5
1999	55	54.0	2.4	153.8	32	67.9	3.4	138.9	87	64.4	3.4	146.7
2000	40	77.0	1.6	155.1	39	75.0	2.2	105.3	79	75.0	1.9	135.6
2001	28	106.1	2.3	193.5	11	90.0	2.5	193.7	39	93.8	2.4	193.7
Total	**1,118**	**26.0**	**1.8**	**63.1**	**563**	**30.0**	**2.4**	**60.8**	**1,681**	**27.5**	**2.0**	**62.0**

median total assets of $51.74 million for the industry rivals' sample. The differences might be explained by the fact that the authors match the IPOs with at least one rival firm in the same four-digit SIC code, whereas in this study I require at least five firms in the same four-digit SIC code to ensure a well representative portfolio.

Table 3

Descriptive Statistics for Rivals' Sample

The sample consists of all rival firms for 1983-2001 period that satisfy the following criteria: they have daily stock returns available in the CRSP database, there are at least 5 rival firms in each four-digit SIC code with available financial data in the Compustat database for any given IPO, rival firms have no major confounding event around IPO announcements.

Year	Rival firms			
	N	Total Assets	Sales	M/B
		Median	Median	Median
1983	1,616	44.46	56.32	1.48
1984	1,170	37.94	46.75	1.34
1985	1,432	37.19	47.19	1.43
1986	2,041	40.72	43.51	1.38
1987	1,884	45.05	46.94	1.27
1988	1,058	32.14	35.32	1.29
1989	1,153	46.68	48.98	1.39
1990	1,200	40.63	43.39	1.27
1991	1,424	51.38	65.82	1.55
1992	2,225	61.82	67.18	1.48
1993	2,661	69.59	79.63	1.57
1994	2,743	77.65	86.06	1.49
1995	2,647	78.37	80.97	1.75
1996	3,266	87.41	87.67	1.68
1997	3,336	84.34	77.26	1.78
1998	2,749	89.23	83.07	1.61
1999	2,167	115.05	104.27	1.90
2000	2,473	120.48	96.20	1.57
2001	1,546	104.65	65.87	1.83
Total	**38,791**	**68.95**	**69.37**	**1.54**

3.3.3. Methodology

To capture the valuation effects of industry rivals in response to IPO announcements, I use event study methodology to measure the industry rivals' share price reaction. Day 0 is the registration date on the Registered Offerings of Securities tape of the Securities and Exchange Commission (SEC). Daily share prices for rivals' sample are from the Center for Research in Securities Prices (CRSP). To measure abnormal returns, I employ the market-adjusted model (Brown and Warner, 1985).

$A_{p,t} = R_{p,t} - R_{m,t}$, where $R_{m,t}$ is the return on the CRSP value weighted index for day *t*.

This model is well specified when securities come from the same industry group and especially when there is a clustering in events. Brown and Warner point out that there could be a high degree of cross-sectional dependence in market/market adjusted model and potential misspecification. To account for potential cross-correlation of returns induced by a clustering of industry observations in calendar time, I construct an equally weighted portfolio of rival firms within the same industry (4-digit SIC code) and perform event tests on the returns to the industry portfolios. To test whether there is a significant difference in mean (median) cumulative abnormal returns (CAR) between two subsamples, I use t-test and Wilcoxon rank-sum test, respectively.

The next step is to analyze the cross-sectional variation in intra-industry information effects of IPO announcements. Previous studies show that industry characteristic, rival-specific characteristics and event-specific characteristics can explain the variations in intra-industry information effects. Based on theoretical predictions of going public decision, I estimate the following model:

$$RivalCAR_i = \alpha_0 + \alpha_1 CONCMKT_i + \alpha_2 RivalSIZE_i + \alpha_3 RivalM/B_i + \\ + \alpha_4 VCbackedIPO_i + \alpha_5 IPO\_SIZE_i + \alpha_6 M/B_i * CONCMKT_i + \varepsilon_i$$

The dependent variable is the three-day CAR of each industry rival in response to the announced initial public offering of firm *i*. $CONCMKT_i$ is the pre-IPO concentration level in the 4-digit SIC code. I use Herfindahl Index (HI) to measure the concentration level. The concentration variable is obtained by multiplying the HI by a dummy variable that takes on a value of one if rival operates in a highly concentrated industry (HI>median industry) and zero otherwise. $RivalSIZE_i$ equals 1 if the rival size (proxied by pre-IPO total assets) exceeds industry median. $RivalM/B_i$ equals 1 if the M/B ratio of rival firm exceeds industry median. $VCbackedIPO_i$ is an interactor variable that takes value of one if IPO is venture backed and zero otherwise. IPO_SIZE_i is the relative size of IPO firm computed as the ratio of IPO firm's total assets to rival's total assets.

3.4. Empirical Results

3.4.1. Rivals' valuation effects at the IPO announcement date:

I use three-day cumulative abnormal returns (CARs) for equally-weighted rival portfolios as a measure of information transferred from IPO firms to rivals. Table 4 presents both mean and median CARs for all rivals and for subsamples based on rivals' characteristics. Both mean (0.371%) and median (0.279%) CARs for the entire sample are positive and significantly different from zero, which suggest that going public decisions have positive externalities effects on existing publicly held firms that share a common valuation factor. Benveniste, Busaba, Wilhelm and Yu (2003) find a positive effect of going public decisions on privately held firms within the same industry. The likelihood of going public is determined by the factors such as: previous IPOs' underpricing, price revisions, and withdrawals. They conclude that firms decide to go public when they observe positive outcomes (i.e. less underpricing) from their contemporaries (i.e. firms that go public in about the same time). The positive reaction for rivals support the hypothesis that going public decisions signal positive prospects for industry and this information conveyed at the filing date is transferred to similar publicly traded firms.

When discussing the hypotheses, I indicated that the net wealth effect of an IPO on its rivals is the sum of potentially two opposing consequences. It is possible that some rivals react positively and some negatively. Partitioning the rivals based on their characteristics (market-to-book value, size), generate different reactions in response to IPO announcements. Table 4 shows that rivals with market-to-book value higher than the industry median experience a positive and significant reaction (0.356%) in response to IPO announcements, whereas those with market-to-book value below industry median have no valuation changes (at the median level). The median reaction of large size rivals is positive and significant (0.302%), but the median reaction of small

size rivals is insignificant. This is inconsistent with previous studies in intra-industry information transfer that document a negative relation between the expected change in valuation induced by a public announcement and firm size (Atiase, 1985, and Slovin et al., 1991). It might be the case that the insignificant reaction of small size rivals is the result of offsetting positive and negative effects.

Table 4

Rivals' reaction in response to IPO announcements

This table presents 3-day mean and median announcement period cumulative abnormal return (%) for rival portfolios in response to initial public offerings conducted during 1983-2001 period. The abnormal returns are equally weighted market adjusted returns. N is the number of observations that have the same four-digit SIC code as IPO firms, have no major confounding event around IPO announcements and have announcement period return available on CRSP. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	N	Mean	Median
All rivals	38,791	0.371***	0.279**
Large size rivals (above industry median)	21,162	0.302***	0.258**
Small size rivals (below industry median)	17,629	0.433***	0.061
High M/B rivals (above industry median)	19,177	0.618***	0.356***
Low M/B rivals (below industry median)	19,614	0.139	-0.103

3.4.2. Variations in Rivals' Abnormal Returns

3.4.2.1. Univariate Analysis

The major hypothesis in this study is that venture backed IPOs signal positive information about the related industry and this has a significant positive impact on stock prices of rival companies. To shed more light on the rivals' valuation effects in response to IPO announcements, I analyze the rivals' CARs for two different subgroups, based on whether IPO is venture backed or not. Within each group, I split the sample into subgroups based on rivals' specific characteristics (market-to-book ratio, size and industry concentration). Previous studies show that venture backed IPOs convey positive signals to the market (Brav and Gompers, 1997) and, therefore, investors might incorporate these expectations at the filing date.

Table 5 shows the CARs for rival portfolios in response to venture backed IPOs (Panel A) and non-venture backed IPOs (Panel B). The median wealth effect experienced by rivals when an IPO is venture backed is positive (0.293%) and significant at the 1% level. The median CARs, however, are insignificant for rivals when IPOs are not venture-backed. These results imply that the average positive reaction of rivals is driven by the presence of venture backed IPOs. This is consistent with the hypothesis that a venture backed IPO signals better prospects for the IPO-affiliated industry than when an IPO is not backed by venture capitalist.

Table 5 also reveals that when IPOs are venture backed, higher M/B rivals enjoy positive and statistically significant wealth gains. Although lower M/B rivals show positive gain, this result is not significant. On the other hand, when IPOs are non-venture backed, higher M/B rivals experience positive but insignificant wealth gain, while lower M/B rivals negative (significant at the 10% level) abnormal returns. These results lead me to conclude that the positive effect signaled by venture-backed IPOs exceeds the negative (competitive) effect due to a new entrant,

but when an IPO is not backed by venture capital, the negative effect is more pronounced for lower M/B (poorer performing) rivals.

Based on industry concentration level, rivals reaction in response to venture backed IPOs, is positive and significant, but insignificant in response to non venture backed IPOs. This suggests that regardless of the level of competition in the industry they operate, investors in rival firms interpret the positive signal of venture backed IPO announcements as having industry wide implications. The magnitude of rivals' reaction is higher for those in less concentrated (more competitive) industries (0.390%) than those in highly concentrated industries (0.240%). However, the differential impact is not statistically significant. It seems that rival firms in highly concentrated industries get lower net benefits from the positive information signaled by venture backed IPO announcements. In the absence of a venture-backed IPO, neither high- nor low-concentration rivals win.

Lang and Stulz (1992) provide the important result that information transfer can differ across industries depending on the concentration level. Their results suggest that an announcement made by a firm in a low concentrated industry is likely to reveal comparative information for industry rivals. Following their procedure, I use Herfindhal Index to split the rivals in highly concentrated (above median HI) and less concentrated (below median HI) groups.

Table 6 shows the mean and median 3-day CARs for both groups. At the mean level, rivals in low concentrated industries (i.e. high competition) have a higher reaction than those in highly concentrated industries; however, the difference between the two groups (High-Low) is not statistically significant.

Table 5
CARs for rival industry portfolios partitioned by event and rivals' characteristics

This table shows 3-day CARs based on whether IPOs are venture backed or not. Within each group, I split the sample in subgroups based on rivals' specific characteristics (market-to-book ratio, size, and industry concentration level). The market-to-book ratio is the ratio of market value of equity plus book value of liabilities to book value of total assets. Rival size is proxied by total assets. The level of concentration is measured by Herfindahl Index (HI) defined as the sum of square market share of each firm in the four-digit SIC code. Panel A presents the mean and median CARs for rival industry portfolios in response to venture-backed IPO announcements. Panel B presents the mean and median CARs for rival industry portfolios in response to non-venture backed IPO announcements. The t-statistic and Wilcoxon-Z are used to test statistical differences in mean and median between two subsamples. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	Panel A: Rivals' reaction in response to venture backed IPOs			Panel B: Rivals' reaction in response to non-venture backed IPOs			Difference (VC-non VC)	
	N	Mean	Median	N	Mean	Median	Mean	Median
All	14,534	0.511***	0.293***	24,257	0.060	-0.063	0.451*	0.356***
> median M/B	7,085	0.578***	0.377**	12,092	0.201*	0.110	0.377*	0.267**
≤ median M/B	7,449	0.478***	0.177	12,165	-0.062	-0.192*	0.540**	0.369**
Mean Difference (High-Low)		0.100			0.263*			
Median Difference (High-Low)			0.200			0.302*		
>median size	7,892	0.311***	0.168	13,270	0.085	-0.032	0.226*	0.200*
≤median size	6,642	0.726***	0.270	10,987	-0.009	-0.143	0.735***	0.413**
Mean Difference (Large-Small)		-0.415			0.094			
Median Difference (Large-Small)			-0.102			0.111		
> median HI	6,684	0.570**	0.240*	11,811	0.001	-0.080	0.569**	0.320**
≤ median HI	7,850	0.400**	0.390*	12,446	0.200*	-0.040	0.200	0.430***
Mean Difference (High-Low)		0.170			-0.200			
Median Difference (High-Low)			-0.150			-0.040		

Table 6

Rivals' cumulative abnormal returns classified by level of concentration

This table shows mean and median 3-day equally weighted market adjusted returns for rival firms classified by level of concentration. The level of concentration is measured by Herfindahl Index (HI) defined as the sum of square market share of each firm in the four-digit SIC code. The market share is the firm's annual sales at the fiscal year-end prior to IPO announcement as a percentage of the industry's. The t-statistic and Wilcoxon-Z are used to test statistical differences in mean and median between two subsamples. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

HI	N (rivals)	Mean	Median
>median	18,495	0.175*	0.023
≤median	20,296	0.270**	0.115
Difference in mean		-0.096	
Difference in median			-0.093

To further examine the impact of industry concentration level on rivals' reaction in response to IPO announcements, I measure the information transferred based on various cross-classifications: industry concentration and rivals' market-to-book value and industry concentration and rivals' size. Table 7 presents the mean and median 3-day CARs for rival portfolios based on both rivals' and industries' specific characteristics. Panel A shows the rivals' reaction in response to venture backed IPOs. The significant negative CAR of 0.14% suggests that rivals with low market-to-book value that operate in less concentrated industries have a competitive disadvantage when a competitor goes public. This is consistent with the hypothesis that, in a competitive environment (low concentration), rivals with low growth opportunities (poor performing rivals) do not have the ability to respond to the competitive threat of a new entrant. Rivals with high market-to-book value experience positive valuation effects (0.07%) if

they operate in highly concentrated industries and have no significant valuation changes if they operate in less concentrated industries. Consistent with Atiase's (1985) argument, rivals' size plays an important role in information transferred. Depending on the level of concentration and rival's size, the magnitude of information transferred differs. At the median level, for example, small size rivals' CAR is more pronounced in less concentrated industries (-0.19%) than in highly concentrated industries. These results suggest that small size rivals are more vulnerable in a competitive environment.

When IPOs are not venture backed, all rivals irrespective of the quality (above- and below median M/B) or size (above- or below-median size) lose (significant at least at the 10% level) in less concentrated industries. This result implies that in the absence of venture capitalists at the time of IPO, competitive effect is more pronounced.

3.4.2.2. Relative size of IPO firm

The size of IPO firm relative to the size of industry rivals may convey different information to industry rivals. The larger the relative size of IPO firm, the greater the impact on industry rivals' reactions, because large IPO firms convey more information for industry counterparts. Table 8 shows the impact of IPO firms' size on industry rivals' valuation effects. Rivals are classified in quartiles, based on the relative size of IPO firm (smallest IPO firms-1, largest IPO firms-4). Except for quartile 1, both mean and median rivals CARs are positive and significant. This suggests that relatively small IPO firms do not have a significant impact on rivals, but as the relative size of IPO firm increases (quartile 2 to quartile 4), rivals experience significant wealth gains in response to IPO announcements. This finding is consistent with the hypothesis that the larger the relative size of IPO firm, the higher the rivals' reaction. The

difference in mean/median between quartile 1 and quartile 4 is significant different for all windows. This implies that larger IPOs (Q4) convey more information than smaller IPOs (Q1) and this information has industry-wide implications.

Table 7

Two-way classification of industry rivals' portfolios

This table presents the mean (median) 3-day rivals' CARs based on various cross-classifications. HI is the Herfindhal Index defined as the sum of square market share of each firm in the four-digit SIC code. The market share is the firm's annual sales at the fiscal year-end prior to IPO announcement as a percentage of the industry's. The market-to-book ratio is the ratio of market value of equity plus book value of liabilities to book value of total assets. Rival size is proxied by total assets. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

A. Venture Backed IPOs (N=563)

	Above median HI			Below median HI		
		CAR (%)			CAR (%)	
	N	Mean	Median	N	Mean	Median
Above median M/B	3331	0.75**	0.07*	3754	0.38*	-0.11
Below median M/B	3353	0.50**	-0.13	4096	0.21	-0.14*

	Above median HI			Below median HI		
		CAR (%)			CAR (%)	
	N	Mean	Median	N	Mean	Median
Above median size	3679	0.36**	-0.03	4213	0.20*	-0.08
Below median size	3005	0.93**	-0.08	3637	0.41	-0.19*

B. Non Venture Backed IPOs (N=1,118)

	Above median HI			Below median HI		
		CAR (%)			CAR (%)	
	N	Mean	Median	N	Mean	Median
Above median M/B	5866	0.24*	-0.24*	6226	0.06	-0.23*
Below median M/B	5945	0.00	-0.34**	6220	0.04	-0.49**

	Above median HI			Below median HI		
		CAR (%)			CAR (%)	
	N	Mean	Median	N	Mean	Median
Above median size	6367	0.17*	-0.15	6903	0.00	-0.27*
Below median size	5444	0.06	-0.47**	5543	0.03	-0.48*

Table 8

The impact of the relative size of IPO firm on industry rivals

This table shows the median/mean CARs for rival portfolios classified by the relative size of IPO firm. Rival firms include firms on Compustat that have the same four-digit SIC code as IPO firm, do not a have a major public announcement around IPO filing date and have returns available on CRSP database. The sample covers the 1983-2001 period. The relative size of IPO firm is defined as the ratio of IPO firm's total assets to rival's total assets. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

Panel A	**Relative size of IPO firm**				
	Q 1 Smallest IPO firms	**Q 2**	**Q 3**	**Q4** Largest IPO firms	**Q1-Q4**
	Median	Median	Median	Median	p-value
CAR (-1, 0)	0.12	0.15***	0.23***	0.18***	0.00
CAR (-1,1)	0.12	0.25***	0.29***	0.33***	0.03
CAR (-2, 2)	0.11	0.36**	0.41***	0.63***	0.00

Panel B	**Relative size of IPO firm**				
	Q 1 Smallest IPO firms	**Q 2**	**Q 3**	**Q 4** Largest IPO firms	**Q1-Q4**
	Mean	Mean	Mean	Mean	p-value
CAR (-1, 0)	-0.01	0.18**	0.23***	0.20***	0.01
CAR (-1,1)	0.11	0.17**	0.19**	0.28***	0.01
CAR (-2, 2)	0.08	0.22**	0.30**	0.47***	0.00

3.4.2.3. Multivariate analysis

The univariate results provide evidence that rival firms react differently to IPO announcements depending upon event specific characteristics and rivals' specific characteristics. To examine the cross-sectional variation in intra-industry information effects of IPO announcements, I estimate the following model:

$$RivalCAR_i = \alpha_0 + \alpha_1 CONCMKT_i + \alpha_2 RivalSIZE_i + \alpha_3 RivalM/B_i + \\ + \alpha_4 VCbackedIPO_i + \alpha_5 IPO\_SIZE_i + \alpha_6 M/B_i * HI_i + \varepsilon_i$$

The abnormal returns are computed for each individual rival using market-adjusted model. The dependent variable is the 3-day cumulative abnormal returns of each individual rival and the independent variables are factors that may explain the variation in rivals' valuation effects in response to IPO announcements. $CONCMKT_i$ is the pre-IPO concentration level in the 4-digit SIC code. I use Herfindahl Index (HI) to measure the concentration level. The concentration variable is obtained by multiplying the HI by a dummy variable that takes on a value of one if HI>median and zero otherwise. $RivalSIZE_i$ equals 1 if the rival size (proxied by total assets, prior to the IPO announcement) exceeds industry median. $RivalM/B_i$ equals 1 if the M/B ratio of rival firm exceeds industry median. $VCbackedIPO_i$ is an interactor variable that takes value of one if IPO is venture backed and zero otherwise. IPO_SIZE_i is the relative size of IPO firm computed as the ratio of IPO firm's total assets to rival's total assets.

Table 9 presents the cross-sectional results based on individual rivals' CARs at the IPO filing date. Model 1 shows the results when only the factors related to IPO's specific characteristics are

Table 9

Cross-sectional variation in rivals' valuation effects

This table shows the results of individual rival valuation effects in response to an IPO filing. The dependent variable is the 3-day individual rival abnormal returns. Relative size of IPO firm is the ratio of IPO firm's total assets to rival's total assets. VC backed IPO is equal to 1 if IPO is venture backed and zero otherwise. HI is equal to 1 if the rival operates in a highly concentrated industry and zero otherwise. Rival's M/B equals 1 if it exceeds the industry median. M/B is the ratio of market value of equity plus book value of liabilities to book value of total assets. Rival's relative size equals 1 if rival size exceeds the industry median. Rival size is proxied by its total assets. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	Model 1	**Model 2**	**Model 3**	**Model 4**
Intercept	0.111***	0.187**	0.160	0.223
Relative size of IPO firm	0.055**		0.055**	0.061**
VC backed IPO	0.360***		0.354***	0.335***
HI dummy		0.144*	0.161*	
Rivals' M/B		0.084**	0.090**	
Rival size relative to industry		-0.109	-0.118	-0.199
High M/B, High HI				0.376**
High M/B, Low HI				0.168**
Low M/B, High HI				0.217*
R^2	0.093	0.095	0.103	0.110

included in the model. Consistent with findings in the univariate analysis, rivals have positive and significant valuation effects (0.360%) when the IPO is venture backed. This result is consistent with Lerner (1994) and Brav and Gompers (1997) who demonstrate that venture backed IPOs are successful in timing the market and better than non-venture backed IPOs. The

implication is that the signaling and timing ability of venture backed IPOs have a positive impact on industry rivals; they experience significant positive valuation effects because investors reassess the value of similar existing publicly traded firms at the time a venture capitalist brings a firm public. The positive coefficient estimate on relative size of IPO firm (0.055%) suggests that the larger the size of IPO firm relative to industry counterparts, the higher the individual rival's reaction. This suggests that larger IPO firms relative to their rivals convey more information than small IPO firms.

Model 2 presents the results for factors related to industry and rivals' specific characteristics. The degree of industry concentration and level of rivals' growth opportunities are positively related to rival valuation effects. However, the coefficient estimate on rival size is not statistically significant. This implies that rival size is not an important determinant in explaining cross-sectional variation in individual rivals' valuation effects.

Model 3 controls for both event specific factors and rivals specific factors, simultaneously. The results are qualitatively similar to those reported when the models are estimated separately.

Model 4 adds the interaction between market-to-book ratio and concentration level measured by Herfindahl Index. There are four possible categories: high M/B, high HI; high M/B, low HI; low M/B, high HI and low M/B, low HI. For this case, a set of binary variables is necessary. To avoid the dummy variable trap, I drop the dummy variable for the last category (low M/B, low HI). The coefficient for high M/B, high HI category is positive (0.376%) and significant at 5% level which implies that rivals with high growth options in highly concentrated industries have higher reaction than those with low growth options that operate in less concentrated industries. Rivals with high market-to book value that operate in less concentrated

industries also have higher reaction than those with low market-to-book value in less concentrated industries (0.168%). This suggests that in a competitive environment, rivals with high market-to-book value have a higher propensity to take advantage of growth options signaled at the IPO filing date, or to respond to a competitive threat of a new incumbent. Low market-to-book rivals that operate in highly concentrated industries react more than those with the same degree of valuation but operating in less concentrated industries (0.217%). These results are consistent with those presented in Table 7.

3.4.3. Impact of Price Revisions on Rivals' Valuation

The book-building phase (the period between filing date and offer date) is a two-way information channel. Going public firms reveal information at the time they file an initial public offering prospectus and receive information (positive/negative) from informed investors during the road show. Based on the type of information received, firms adjust the offer price (upward/downward) and make public the new information at the time of listing. To test the hypothesis that price revisions have a significant impact on rivals in the same industry, I divide the IPO sample in upward price revisions IPOs and downward price revisions. Then, I calculate rival portfolios CARs for different event windows (day 0 is the offer day). Table 10 shows the median CARs for rival portfolios in response to upward/downward IPO price revisions. For all event windows, the median CARs is negative and statistically significant in response to downward price revisions. As expected, negative information revealed in the form of downward price revisions makes rivals worse off and this can be explained as rivals being overly optimistic about the future prospects within the industry at the time the IPO firm files with SEC. On the other hand, the median CARs is insignificant in response to upward price revisions, which

Table 10

Rivals' cumulative abnormal returns in response to IPO price revisions

This table presents the median CARs for rival firms classified by the direction of IPO price revisions (upward and downward). The event day (0) is the offering day. The sample covers the 1983-2001 period. Price revisions equal the ratio of (offer price-mid filing price) to mid filing price. The Wilcoxon rank sum test performs statistical differences in median between two independent subsamples. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

		Median CARs		
		(-1, 0)	(-1, 1)	(-2, 2)
IPO price revisions*	Upward (N=647 IPOs)	-0.067	-0.074	-0.225
	Downward (N=840 IPOs)	-0.220***	-0.333***	-0.398***
Difference in median		-0.153***	-0.259***	-0.172***

*194 IPOs have no price revisions

which suggests that rivals do not react to subsequent information released, if this information is positive. It might be the case that they already incorporated the positive information generated by going public decisions at the filing date, or there are offsetting positive and negative effects. To further examine the impact of price revisions on rival's valuation effects, I look at the variation of industry rival portfolios CARs for subsamples of venture backed IPOs and non-venture backed IPOs. Table 11 (Panel A) shows that for venture-backed IPOs, downward price revisions have negative impact on rivals, while upward revisions create positive wealth for rivals. However, wealth loss under downward revision far exceeds the wealth gains resulting from upward revisions. Upward price revision information generates opposite reactions for industry rivals. Positive and significant reaction is documented for venture backed IPOs sample (0.111%) but

negative and significant reaction for non-venture backed IPOs sample (-0.228%). This implies that investors in rival firms interpret the positive information at the offering day as good news for industry only when this is certified by a venture capitalist.

In Panel B, the results show that regardless of rivals' characteristics, downward price revisions adversely affect rival firms within the same industry. The magnitude of information transfer is higher for small size, low market-to-book rivals and for those in low concentrated industries. Rivals reaction in response to upward price revisions is differentiated based on their characteristics. The results show that only high market-to-book rivals have the ability to take advantage of positive prospects available in the industry. However, their reaction is small (0.019%) and marginally significant at 10% level.

Overall, the results in Table 11 are consistent with hypothesis that negative information revealed in the form of downward price revisions adversely impacts rival firms within the same industry.

Table 11
Impact of price revisions partitioned by event and rivals' specific characteristics

This table shows 3-day rivals CARs in response to upward/downward price revisions (day 0 is the offer day). Within each group (downward/upward), I split the sample in subgroups based on event characteristics (venture backed or non-venture backed IPOS) and rivals' specific characteristics (market-to-book ratio, size, and industry concentration level). The market-to-book ratio is the ratio of market value of equity plus book value of liabilities to book value of total assets. Rival size is proxied by total assets. The level of concentration is measured by Herfindahl Index (HI) defined as the sum of square market share of each firm in the four-digit SIC code. Panel A shows the impact of price revisions and event specific characteristic. Panel B shows the impact of price revisions and rivals' specific characteristics. The t-test and Wilcoxon rank sum test performs the statistical differences in means/medians for two subsamples. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

Panel A: Impact of price revisions and event specific characteristics

	Downward price revisions			Upward price revisions				
		CAR (%)			CAR (%)		Difference (D-U)	
	N	Mean	Median	N	Mean	Median	Mean	Median
Venture backed IPOs	5,894	-0.260**	-0.313**	7,351	0.190**	0.111*	-0.450**	-0.424**
Non-venture backed IPOs	11,674	-0.240*	-0.341**	9,022	-0.350**	-0.228*	0.110	-0.113
Difference (non-VC-VC)		0.020	-0.028		-0.540*	-0.339*		

Panel B: Impact of price revisions and rivals' specific characteristics

	Downward price revisions			Upward price revisions				
		CAR (%)			CAR (%)		Difference (D-U)	
	N	Mean	Median	N	Mean	Median	Mean	Median
Above median size	9,651	-0.234*	-0.302**	9,036	0.040	0.051	-0.274*	-0.353**
Below median size	7,917	-0.384**	-0.367**	7,337	-0.230**	-0.259*	-0.154*	-0.108
Difference (S-L)		-0.150*	-0.065		-0.270**	-0.310**		
Above median M/B	8,700	-0.210	-0.230**	7,993	0.100	0.019*	-0.310**	-0.249**
Below Median M/B	8,868	-0.471*	-0.410**	8,380	0.231**	-0.165*	-0.702***	-0.245*
Difference (L-H)		-0.261*	-0.18		0.131	-0.184**		
Above median HI	8,654	-0.144**	-0.227**	7,479	-0.054	-0.102	-0.090	-0.125
Below median HI	8,914	-0.365**	-0.415**	8,894	-0.014	-0.038	-0.351***	-0.377**
Difference (L-H)		-0.221*	-0.188		0.040	0.064		

*194 IPOs have no price revisions

3.5. Summary and conclusions

This study provides evidence that going public decisions have positive informational externalities on existing publicly traded firms within the same industry. The positive valuation effects of rival firms are driven by venture backed IPOs externality which indicates that the presence of venture capitalists signals positive prospects for industry and this information is transferred to industry rivals. This finding is consistent with hypothesis that a venture backed IPO signals superior information to the market than a non-venture backed IPO and investors react differently depending on the event specific characteristics. Another important result is that rivals with high market-to-book value experience positive and significant valuation effects in response to venture backed IPOs and low market-to-book value rivals have negative and significant valuation effects in response to non-venture backed IPOs. This implies that high market-to-book rivals have the ability to incorporate future growth opportunities available within an industry when this information is signaled at the filing date. On the other hand, low market-to-book rivals that operate in low concentrated industries may have a competitive disadvantage when a non-venture backed IPO firm enters, probably because the newly public firm is more technologically advanced than its rivals.

One important factor that influences the direction and magnitude of rivals' valuation effects is the relative size of IPO firm. The evidence suggests that the larger the size of IPO firm relative to industry counterparts, the greater the impact on rivals. Rivals experience more positive wealth effects when a relatively larger firm goes public.

When a venture-backed IPO undergoes downward price revision at the offering date, it entails negative valuation consequence for rivals. However, the opposite does not hold when

upward price revisions occur. It might be the case that they already incorporated the positive information generated by going public decisions at the filing date.

CHAPTER IV

INFORMATIONAL EXTERNALITIES OF BANK INITIAL PUBLIC OFFERINGS

4.1. Introduction

In Chapter 3, I have examined the information externalities surrounding IPO announcements of industrial firms. In this Chapter, I study the informational externalities resulting from IPO announcements of banking firms. The need for this separate investigation stems from prevailing arguments that range from one extreme that bank announcements should not contain information externalities to the other that banks have greater externalities than industrial firms.

Black (1975) and Fama (1980) argue that there are no external information effects from individual bank actions. They demonstrate that banks are like open-end mutual funds in which liabilities are claims on the bank's asset portfolio that can be marked to market continuously. Therefore, asset activities are governed by the Modigliani-Miller theorem (1958), implying that bank asset portfolio decisions are irrelevant to firm value. This view implies that bank loans do not provide any informational advantage relative to publicly traded debt securities, and therefore there should be no informational externalities from individual bank announcements such as *initial public offerings*.

On the other hand, Diamond and Dybvig (1983), Diamond (1984, 1991), Ramakrishnan and Thakor (1984), and Gorton (1985) make a strong case for the existence of information

externalities linked to bank announcements. Their argument goes as follows. Banks collect and process information about loan customers and monitor borrower activities. These informational advantages make bank loans a cost-efficient mechanism of private external financing for some set of borrowers, especially those with favorable private information. In practice, there is difficulty of marking bank loan portfolios to market due to confidentiality of bank-borrower relationship and limited disclosure about lending agreements. Therefore, bank claims held by shareholders and creditors are unlikely to accurately reflect asymmetric information impounded in bank loan portfolios. Moreover, banks are not required to disclose information about individual loans and loan portfolio quality. Bank managers have considerable flexibility to adjust publicly disclosed accounting measures of loan portfolio quality. Thus, according to this viewpoint, asymmetric information impounded in bank loan portfolios gives rise to information externalities related to bank announcements.

These characteristics of the information structure of bank operations limit the market's access to information needed to assess individual bank value and risk, creating the potential for informational externalities.

Slovin, Sushka and Polonchek, 1992) posit that a bank public announcement might generate external information effects on other banks to an extent not found in industrial sector. They argue that the presence of bank capital regulation increases the informational externalities of bank managerial decisions. Regulators impose accounting based minimum capital-to-asset ratios and specify which bank liabilities qualify for regulatory capital. The dominant component in the required minimum is the book value of equity and, therefore is not related to the market value of equity. Unfavorable outcomes of regulator examinations can increase pressure on bank managers to raise regulatory capital, i.e. through an initial public offer. Thus, a bank decision to

go public is not entirely a voluntary action as it is for unregulated, industrial firms, but it reflects private information held by managers and regulators about bank's capital and the value of its loan portfolio.

Empirical findings in the finance literature also support a separate look at industrial and banking firms. For example, the underpricing of IPOs undertaken by financial institutions is 6.5% (Ritter, 1991) relative to an average of 11.8% for a sample of industrial firms during 1985-1997. Ritter (1991) also documents that IPOs undertaken by industrial firms underperform a size-and-industry matched sample for three years after going public, while financial institutions outperform the benchmark by almost 68% over the same period. Similar results are documented by Houge and Loughran (1999) who find that bank IPOs outperform various benchmarks for a two-year period, but this performance declines in the third year. They attribute this result to higher loan losses resulting from changes in the post-IPO risk of the banks' loan portfolios.

Conflicting theoretical arguments on information externalities of industrial versus banking firms coupled with differences in empirical results pertaining to these two groups prompt me to examine banking firms[1] separately from industrial firms. In this Chapter, I analyze whether bank IPO announcements have external information effects on rival banks. First, I examine the information externalities effects in aggregate for bank IPO announcements, as well as the distribution of rival bank abnormal returns in response to each announcement. In this way, I focus on how event-specific and bank-specific factors explain the variation of rival bank responses to IPO announcements.

[1] In this study, no distinction is made between the organizational structure of banks, savings and loans, bank holding companies. Therefore, the term bank" is meant to include banks, thrifts, and bank holding companies.

4.2. Literature survey

The potential for informational externalities in the banking industry has been empirically examined for various bank announcements. Slovin et al. (1992) compare the informational externalities of bank seasoned equity offerings with those of industrial firms. Given the difference in information structure between banking and the industrial sector, they hypothesize that bank SEOs have higher externalities for their industry counterparts than those announced by industrial firms. The results demonstrate that private information structure of bank lending, combined with the bank regulation process, induce the financial market to interpret stock issuance announcements as negative signals of value for other commercial banking firms. In contrast, no significant intra-industry effect is documented for rivals of industrial firms that announce seasoned equity issues, suggesting that SEOs release only firm specific information with no external effects for other firms that share a common valuation factor.

Docking et al. (1997) examine the intra-industry effects of loan-loss reserve (LLR) additions and find significant contagion effects for non-announcing money-center banks and regional banks following LLR announcements by other regional banks. The negative contagion effects are most clearly associated with LLR announcements by regional banks from the New England, Mid-Atlantic and Southwest regions. They find no significant contagion effects in other regions, which suggests that the overall negative contagion effects associated with regional bank LLR announcements stem from a small subset of the overall group of regional banks. Also, there is a difference in non-announcing regional banks' reaction and that of money center banks. On average, regional banks have more negative effects than money center banks. As suggested by Madura and McDaniel (1989), the market knows relatively less about the quality of regional

bank loan portfolios, which is why regional bank LLR announcements are more informative than money-center bank announcements.

Bank acquisition events have potential for contagion effects for target banks' rivals. Akhigbe and Madura (1999) show that investors in rival banks interpret the information content of bank acquisitions positively, on average. The rivals' valuation effects are positively related to the valuation of target banks and inversely related to the size and prior performance of rival banks. Also, the valuation effects are more favorable for rivals that are ultimately acquired in two years. Therefore, not only event specific characteristics are informative for rival banks, but also the strength of the signal transmitted is a function of rival banks' characteristics, as a lower size and weaker performer rival bank may face the probability of subsequently being acquired.

The extensiveness of asymmetric information at banks, which is central to bank models, has been examined simultaneously for dividend reductions and regulatory enforcement actions (Slovin et al., 1999). The combination of a bank announcement and a regulatory enforcement action may have a different impact on rival banks than a pure bank announcement. Consequently, constraints on competition in banking that result from governmental restrictions on entry and expansion may create externalities to dividend reductions. Moreover, regulations restrict bank managerial activities and, as a result, lead to a direct influence on bank dividend policy. Hence, regulation may affect the degree to which dividend reductions signal managerial information about future bank earnings, and induce externalities. The results show that dividend reductions by regional banks generate significantly positive, competitive effects for rival banks in the same geographic area. These effects occur in response to dividend reductions at regional banks that have bank-specific rather than generalized causes. Regulatory enforcement actions generate positive competitive effects on banks in the same geographic area, paralleling those for

dividend reductions, which suggest that there is imperfect competition in local banking markets. On the other hand, dividend reductions at money center banks generate negative externalities for regional banks. The contagion effects suggest that rival banks interpret these announcements as altered expectations about bank cash flows, rather than the aggressiveness of regulators.

4.3. Hypotheses

The informational externalities effects found for industrial IPOs might not be generalized for bank IPOs. The difference in information structure and presence of regulations may lead rival banks to react differently when a bank announces an initial public offering.

To test the theoretical predictions of Diamond and Dybvig (1983) and Gorton (1985), I hypothesize that:

H 8: Rival banks experience wealth effects around bank IPOs announcements.

Rivals' valuation effects may be positive or negative, depending on how investors use the information disclosed at the announcement date to reassess the value of non-announcing banks. However, the positive and negative valuation effects are not mutually exclusive. If going public decisions reveal favorable information about future industry prospects, rivals will experience wealth gains at the announcement date. However, as a result of thrift institutions' conversion to stock charter banks, the competition for market share has been increased, newly formed banks having the same operations as commercial banks. Therefore, rivals may lose some of their market share when a new bank competes more effectively with the funds raised in an IPO. To test this hypothesis, I examine the rival portfolios abnormal returns around IPO announcements

for the entire sample period and for subsamples based on rivals' classification: state rivals and regional rivals.

Local market concentration plays an important role in the intra-information transfer around public announcements. Akhigbe and Madura (1999) show that in-market acquisitions (in which the acquiring and the target bank are headquartered in the same state) create the potential for anticompetitive problems by increasing the probability of collusion among rival banks within the state. Their results show, however, that rival banks do not experience significant abnormal returns, rejecting the hypothesis that there is a positive relationship between the degree of concentration and rivals' valuation effects.

Depending on the local concentration level, rival banks may react differently when a bank goes public. Rivals headquartered in states (regions) with higher concentration level (low competition) are not likely to adversely be affected by a new entrant. However, those located in lower concentrated states (regions) may experience competitive shifts in their market share. To test whether the degree of concentration level influences the rivals reaction in response to bank IPO announcements, I hypothesize that:

H9: The higher the local market concentration level, the lower the valuation effects for rivals in response to bank IPO announcements.

The concentration variable is proxied by the Herfindahl Index. The index is computed as the sum of squared market share of each rival relative to all rivals in the same state/region. Market share is defined as the rival's total assets at the end of fiscal year prior to the IPO announcement divided by total assets of all rivals in the same state/region.

4.4. Data and Methodology

4.4.1. Sample Selection

In this chapter I examine the rivals' share price reactions in response to bank IPO announcements during 1983-2001 period. To measure the abnormal return of rival banks in response to each IPO announcement, a list of IPO announcements was compiled from Thompson Financial Security Database (SDC-Global Issue Database). SDC database contains 502 bank IPOs (SIC 602 and 603) for 1983-2001 period. To be included in the final sample, the IPO banks have to meet the following criteria: 1) offer price of $5 or higher; 2) proceeds data available in SDC; 3) financial data available in the first year of listing (total assets, revenues, shares outstanding); 4) at least one rival bank headquartered in the same state/region with available price information. The final sample of bank IPOs consists of 312 IPOs.

For each of the 312 bank IPO announcements, I establish bank rivals within the same state (for 1983-1996 period) or region (for 1997-2001 period)[2], that satisfy the following criteria: 1) each rival bank is listed on AMEX, NYSE or Nasdaq CRSP files; 2) rival banks do not experience confounding events during a 30 day period centered at the announcement day; 3) they have financial data (total assets, revenues, shares outstanding) available on Compustat.
The final sample of rival banks corresponding to the 312 IPO announcements consists of 6,316 rivals that represent forty-nine states and five regions. Regional location is classified according to banking regions identified by the "American Banker" which closely follows Federal Reserve Districts. There are 5 regions with the following corresponding states: a) Mid-Atlantic region:

[2] According to The Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, any bank holding company was allowed to acquire a bank anywhere in the U.S. Also, "interstate branching", allowed bank holding companies to merge operations across state lines, turning out-of-state banks into interstate branches of the main bank. For a detailed discussion of the regulation/deregulation in the banking industry that has a direct impact on the analysis, see Appendix A.

DE, DC, MD, NJ, NY, PA; b) Southeast region: AL, AR, FL, GA, MS, NC, SC, TN, VA, WV; c) Midwest region: IA, IL, IN, KS, KY, MI, MN, MO, NE, ND, OH, SD, WI; d) Southwest region: CO, LA, NM, OK, TX, UT; e) West region: AK, AZ, CA, HI, ID, MT, NV, OR, WA, WY.[3]

4.4.2. Descriptive statistics

Table 12 presents the frequency of bank IPOs and their corresponding rivals across years. Seventy-three percent of total IPO announcements occur during 1983-1988 period. This is not surprising as numerous thrift institutions converted to stock charter banks after 1982. As a comparison, Houge and Loughran's (1999) sample is very similar with respect to IPOs distribution across sample period. Out of 393 IPOs during 1983-1991, they report 95% occurring during 1983-1988, which is similar to 94.5% of IPOs undertaken over the same sample period.

Table 13 reports mean and median values of selected variables for both bank IPO firms and their rivals. Both mean and median differences between the two subsamples are statistically significant at 5% level. The median total assets of bank IPO firms is $1,071 million, whereas rivals' median total assets is almost double ($1,943 million). Rivals' median revenues is almost three times as that of bank IPO firms ($178 million versus $67 million). Finally, the median market value of rivals ($197 million) is more than five times bigger than the median market value of equity of bank IPO firms ($38 million). I conclude that the sample of bank IPOs is comprised of small, community-based institutions. Even though the sample includes some regional institutions, it contains no large, money center banks. The exact composition of rival portfolios varies with the timing of the event. The average number of rivals per IPO event for the

[3] The distribution of rival banks by states and regions is presented in Appendix B.

1983-1996 period is 39, the median is 11, the minimum is 1 and the maximum is 74. For the 1997-2000 sample period, the average number of rivals per IPO event is 91, the median is 20, the minimum is 8 and the maximum is 116.

Table 12

Frequency of bank IPOs and their rivals across years

The sample consists of bank IPOs during the 1983-2000[4] period that satisfy the following criteria: a) there is at least one rival bank free of any confounding event within the same SIC codes 602 and 603; b) the offer price is at least $5; c) financial data is available in Compustat (both active and research). Rival banks are defined as publicly traded banks within the same state (1983-1996 period) or within the same region (1997-2000).

Year	Number of Bank IPOs	Number of rivals
1983	33	153
1984	25	264
1985	27	153
1986	76	782
1987	40	285
1988	26	167
1989	5	66
1990	3	25
1991	5	115
1992	4	71
1993	14	836
1994	5	306
1995	3	224
1996	10	680
1997	7	366
1998	22	1,359
1999	4	264
2000	3	200
2001	-	-
Total	**312**	**6,316**

[4] No IPO announcement in 2001 met the criteria imposed.

Table 13

Descriptive statistics for bank IPO firms and their rivals

This table reports mean and median values for chosen variables, and the difference in mean/median between bank IPO firms and their rivals with respect to each variable. The sample of bank IPO firms consist of all banks that went public during 1983-2000 period. To enter in the sample they have to satisfy the following criteria: a) there is at least one rival bank free of any confounding event within the same SIC codes 602 and 603; b) the offer price is at least $5; c) financial data is available in Compustat (both active and research). Rival banks are defined as publicly traded banks within the same state (1983-1996 period) or within the same region (1997-2000). To enter in the sample they have to have return data on CRSP around IPO event, financial data on Compustat (both active and research). ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	Bank IPO firms		**Bank rivals**		**Difference**	
Variable (in mil.)	Mean	Median	Mean	Median	Mean	Median
1. IPO Proceeds	19.85	13.80	--	--	--	--
2. Total Assets	1,530.56	1,071.31	8,906.79	1,943.19	-7,376.23**	-871.876**
3. Revenues	135.47	66.66	824.26	178.01	-688.79**	-111.354**
4. Market Value of Equity	65.10	38.30	1,244.26	196.91	-1,179.16**	-158.613**

4.4.3 Methodology

To capture the valuation effects of rivals in response to bank IPO announcements, I use event study methodology to measure the rivals' share price reaction. Day 0 is the registration date on the Registered Offerings of Securities tape of the Securities and Exchange Commission (SEC). Daily share prices for rivals' sample are from the Center for Research in Securities Prices (CRSP). To measure abnormal returns, I employ the market-adjusted model (Brown and Warner, 1985). To obtain the abnormal return of rival bank portfolio, all publicly traded banks that were headquartered in the same state/region as the announcing bank are pooled into an equally-

weighted portfolio. The procedure of creating an equally weighted-portfolio accounts for potential cross-sectional correlation of returns in the industry. The abnormal return of each rival bank portfolio *p* and for each date *t* in the event period *(-2, 2)* is computed as:

$A_{p,t} = R_{p,t} - R_{m,t}$, where $R_{m,t}$ is the return on the CRSP value weighted index for day *t*.

To test whether there is a significant difference in mean (median) cumulative abnormal returns (CAR) between two subsamples, I use t-test and Wilcoxon rank-sum test, respectively.

The next step is to analyze the cross-sectional variation in intra-industry information effects of bank IPO announcements. Previous studies show that industry characteristics, rival-specific characteristics and event-specific characteristics can explain the variations in intra-industry information effects. Based on theoretical predictions of going public decision, I estimate the following model:

$$RivalCAR_i = \alpha_0 + \alpha_1 CONCMKT_i + \alpha_2 RivalSIZE_i + \alpha_3 RivalPERFORM_i + \\ + \alpha_4 1983-1996_i + SIC603_i + 1983-1988_i + \alpha_5 IPO\_SIZE_i + \varepsilon_i$$

The dependent variable is the five-day CAR of each rival bank in response to the announced initial public offering of bank firm *i.* $CONCMKT_i$ is the pre-IPO concentration level in the state or region. I use Herfindahl Index (HI) to measure the concentration level. The Herfindahl Index is computed as the squared sum of fractions of total assets of all rival banks in the state/region in which the announcing bank is headquartered. The concentration variable is obtained by multiplying the HI by a dummy variable that takes on a value of one if HI>median and zero otherwise. $RivalSIZE_i$ is proxied by ln (market value of equity). $RivalPERFORM_i$ is the prior price performance of rival banks. Each rival bank's performance is measured as the difference

between the rival's actual stock return and the CRSP equally weighted index averaged over a 12-month period prior to the announced IPO of bank *i*. A dummy variable that takes value of 1 if the IPO announcement occurs during the 1983-1996 period and zero otherwise is used to check whether rival banks react differently if the regulatory environment is different. Two other dummy variables are used to isolate the rivals' reaction to thrift institutions (SIC 603) and to IPO announcements during the 1983-1988 period (72.8% of the sample). IPO_SIZE_i is proxied by ln (total proceeds raised at the time of IPO).

4.5 Empirical Results

4.5.1. Rival banks' valuation effects in response to IPO announcements

I use five-day cumulative abnormal returns (CARs) for equally-weighted portfolios as a measure of information transferred from bank IPO firms to non-bank firms within the same state/region. Table 14 presents both mean and median rivals' CARs for the entire sample of IPOs and for subsamples: 1983-1996 and 1997-2000. When considering all bank IPO announcements, the mean cumulative abnormal return is 0.52% for state rivals (significant at 1% level) and 0.29% for regional rivals (significant at 5% level). However, the median CAR is significantly different from zero only for state rivals (0.17%). These results support the hypothesis that bank IPO announcements have externalities effects on other banks, consistent with the theoretical predictions of Ramakrishnan and Thakor (1984) and Gorton (1985). The positive reaction for rivals is interpreted as going public decisions signal positive prospects for the entire industry and investors in rival banks incorporate the information disclosed at the filing date to reassess the value of publicly traded banks.

To account for differences in regulations during the sample period, I compute the cumulative abnormal returns for state rivals (1983-1996) and regional rivals (1997-2000) separately. Both mean and median CARs are positive and statistically different from zero (0.56%

Table 14

Valuation effects for rival banks in response to IPOs announcements

This table presents the cumulative 5-day abnormal return for rival bank portfolios in response to 312 bank IPO announcements. Rival portfolios contain all rival banks in the same state/region that were publicly traded at that time, grouped into an equally weighted portfolio by event. Abnormal returns are computed using market-adjusted model.
***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	Regional rivals*		**State rivals**	
	Mean	Median	Mean	Median
All banks' reaction: 1983-2000	0.29**	0.12	0.52***	0.17***
Rivals' reactions by state: 1983-1996	--	--	0.56**	0.35***
Rivals' reactions by region: 1997-2000	0.44**	-0.01		
• *Mid-Atlantic regional banks*	1.98***	1.75***		
• *Midwest regional banks*	-0.01	-0.50**		
• *Southeast regional banks*	0.44***	0.01		
• *Southwest regional banks*	1.52***	0.88***		
• *West regional banks*	0.23	0.11		

* Regional locations are classified according to the American Banker which closely follow the Federal Reserve System districts. The Mid-Atlantic region includes banks in DE, DC, MD, NJ, NY, and PA. The Southeast region includes banks in: AL, AR, FL, GA, MS, NC, SC, TN, VA, WV. The Midwest region includes banks in: IA, IL, IN, KS, KY, MI, MN, MO, NE, ND, OH, SD, WI. The Southwest region includes banks in: CO, LA, NM, OK, TX, and UT. The West region includes banks in: AK, AZ, CA, HI, ID, MT, NV, OR, WA, WY. The New England region includes banks in: CT, ME, MA, NH, RI (no bank IPO during the 1997-2000 period for this region met the criteria selection imposed).

and 0.35% respectively) for state rivals' sample and have higher magnitude than those for the entire sample, which suggests that state rivals interpret the going public decisions favorably as they reveal good prospects for the entire industry. Regional rivals, however, have insignificant reaction at the IPO announcement day (-0.01%) which makes the interpretation difficult. Either offsetting effects (some rivals react positively, some negatively) occur or the IPO announcements do not reveal information that has industry-wide implications. To further examine whether IPO announcements are informative for regional rivals, I compute the cumulative abnormal returns for each region. Positive and significant reactions are present in two regions: Mid-Atlantic (1.75%) and Southwest region (0.88%), while negative and significant reaction is present in the Midwest region (-0.50%). These opposing effects may explain the overall insignificant reaction for the regional rivals' sample, but they show that depending on the regional location of the announcing bank, IPO events convey information that has regional-wide implications. Regional differences in information transfer can be viewed as a byproduct of regional variation in economic conditions, real estate markets, lending practices, the makeup of loan portfolios, etc. Thus, it is important noting the extent to which regional considerations influence the stock price reactions of non-announcing banks. While the overall sample of regional rivals seems to indicate no reaction in response to IPO announcements, notable exceptions and regional influences are present.

4.5.2. The impact of local concentration on rivals' valuation effects

Akhigbe and Madura (1999) show that local market concentration influences the direction of rivals' reaction around bank acquisition announcements. Depending on the local concentration level, rival banks may react differently when a bank goes public. Rivals

headquartered in states (regions) with higher concentration level (low competition) are not likely to adversely be affected by a new entrant. However, those located in lower concentrated states (regions) may experience competitive shifts in their market share. Table 15 presents the results

Table 15

Bank Rivals' reaction classified by level of concentration

This table presents the mean and median 5-day cumulative abnormal return of rival bank portfolios classified by the level of concentration. Herfindahl Index (HI) measures the level of concentration for each state/region. It is defined as the sum of square market share of each bank within any given state/region. The market share is defined as the rival bank's total assets at year-end prior to IPO announcement relative to state or region's total assets. Rival banks are grouped into two subsamples, based on whether they belong to highly concentrated states/regions or low states/regions. Abnormal returns are computed using market-adjusted model. Panel A shows the rivals' reaction in response to a bank IPO in the same state, whereas Panel B shows the rival banks' reaction to a bank IPO in the same region.
***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

Panel A			
Rival banks' reaction in response to a bank IPO in the same state, classified by level of concentration			
		Mean	Median
IPOs: 1983-1996	Below median HI	0.46	0.14
	Above median HI	0.65**	0.48***
Panel B			
Rival banks' reaction in response to a bank IPO in the same region, classified by level of concentration			
		Mean	Median
IPOs: 1997-2000	Below median HI	0.11	-0.32
	Above median HI	0.77***	0.29***

based on whether rival banks belong to a highly concentrated state/region (above median Herfindahl Index) or low concentrated state/region (below median Herfindahl Index). Panel A shows the median cumulative abnormal returns of state rivals equally weighted portfolios in response to IPO announcements during 1983-1996 period. Surprisingly, rivals in low concentrated states (high competition for market share) experience no significant reaction when banks go public. This could be interpreted as if the information disclosed at the IPO announcement date does not reveal comparative advantages to their rivals. Panel B presents the mean and median cumulative abnormal returns for regional rivals in response to bank IPO announcements during the 1997-2000 period. As in the case of state rivals, the reaction is insignificant for those headquartered in low concentrated regions. Even though the median CAR is negative, it is not significant which suggests that going public decisions do not generate competitive effects for bank rivals. Regional rivals in highly concentrated markets, however, experience wealth gains at the IPO announcements date. These findings do not support the hypothesis that the higher the level of market concentration, the lower the rivals' reaction. A possible explanation could be as follow: the going public decision can be viewed as a way to create public shares to facilitate a future acquisition. Rival banks will be likely to target newly formed banks in order to expand their activities within the region and, therefore to increase their clientele portfolios in an efficient way. From this perspective, bank IPO announcements are good news and they translate in wealth gains for rivals.

4.5.3. Cross-sectional variation in rivals' reaction in response to bank IPO announcements

Previous studies show that individual rival's reaction can be explained by both event specific characteristics and rivals' characteristics. To examine the impact of those characteristics

on the degree of information transferred from announcing banks to rivals, I use the individual rival bank's cumulative abnormal returns as dependent variable. The independent variables are the rival size, prior rival performance, degree of local market concentration, and IPO size.

Rival bank size: From Atiase's (1985) work, a general argument can be made that the information-signaling effects are inversely related to the size of the rival. If relatively larger banks are more scrutinized by market participants, then the incremental information would not be conveyed to the relatively large rival banks at the time of the announcement. Thus, the intra-industry effects should be greater for small rival banks. The natural logarithm of the market value of rival banks is used as a proxy for the size of rival bank.

Prior rival performance: If bank rivals with lower price performance have more potential to enhance their own performance in response to more favorable industry prospects, then they should experience a more favorable share price response than other rivals with superior performance. I use the median stock price performance of rival banks as a proxy for performance. The stock price performance is measured as the difference between a firm's actual stock return and the CRSP equally weighted market return averaged over a 12-month period prior to the corresponding bank IPO announcement.

IPO size: The amount of IPO proceeds can influence the magnitude of rivals' reaction. Banks that raise a higher amount of proceeds are expected to convey more information to rivals and, therefore, a positive relationship between the IPO size and rival's reaction is expected. The IPO size is proxied by the natural logarithm of proceeds.

Local market concentration: To account for the impact of local market concentration on individual rival's reaction, I use a dummy variable that takes value of one if the rival bank

belongs to a highly concentrated state/region and zero otherwise. Rivals' reaction is expected to be lower if they are headquartered in highly concentrated markets.

The regression analysis results are presented in Table 16. The coefficient of rival size is positive but marginally significant. This suggests that intra-industry effects are higher for larger rival banks. Coupled with the positive and significant coefficient for concentration dummy, it can be concluded that IPO announcements are informative for large rivals in highly concentrated markets. The coefficient for prior rival performance is negative and significant which suggests

Table 16

Explaining the cross-sectional variation in individual bank rivals' reaction

This table reports the individual bank rival's valuation effects in response to an IPO announcement in the same state/region. The dependent variable is the 5-day cumulative abnormal returns. Rival size is proxied by ln(Market Value of Equity). Rival bank prior performance is the difference between bank's actual stock return and CRSP equally weighted market return over a 12-month period prior to IPO announcements. Herfindahl index is defined as the sum of square market share of each bank within any given state/region. The market share is defined as the rival bank's total assets at year-end prior to IPO announcement relative to state or region's total assets. "Year" is a dummy variable that takes on values on 1 if the IPO event occurs during the 1983-1996 period and zero otherwise. SIC 603 dummy takes the value of one if a thrift institution goes public and zero otherwise. IPO size is proxied by ln(Proceeds).

Dependent variable: Rival bank CAR (-2,2)				
	Model 1	Model 2	Model 3	Model 4
Constant	0.440*	0.421*	0.420*	0.395*
Rival size	0.164*	0.161*	0.161*	0.160*
Rival performance	-0.253***	-0.244***	-0.242***	-0.233***
HI dummy	0.241**	0.240**	0.245**	0.230**
1983-1996 dummy	0.030	0.025	0.020	0.018
IPO size	0.010***	0.009***	0.009***	0.009***
SIC 603 dummy		0.004		0.004
1983-1988 dummy			0.050**	0.040**
R^2	0.100	0.103	0.107	0.108

that rivals with higher prior performance experience lower reaction in response to IPO announcements. This supports the argument that the intra-industry effect is stronger in periods in which rival bank stock returns are relatively low. Thus, rivals with lower price performance have more potential to enhance their own performance in response to more favorable industry prospects. The coefficient of IPO size is positive and significant at 1% level which provides support for the hypothesis that the higher the IPO proceeds, the more information is conveyed to the market and as a result, rivals will have a higher reaction. To account for potential differences in rivals' reaction between the two subperiods with different regulations, I use a dummy variable that takes value of one if the IPOs had occurred during 1983-1996 period and zero otherwise. The coefficient for this variable is insignificant which suggests that rivals do not experience significant different reactions based on rivals' classification. Finally, the coefficient for SIC 603 dummy is positive but not statistically significant. This implies that rival banks do not have a significant reaction when a thrift institution goes public relative to that when a commercial bank goes public. However, the coefficient for 1983-1988 dummy is positive and significant, which suggests that rival banks experience a higher reaction in a period of high IPO activity in the banking industry. This suggests that the higher the IPO activity, the larger the amount of information conveyed to the industry, the higher the rivals' reaction. The results of the regression analysis are similar when the last two dummy variables are not included.

4.6. Summary and conclusions

The evidence provided in this chapter is consistent with theoretical predictions of Ramakrishnan and Thakor (1984), and Gorton (1985) who predict that bank announcements have the potential for externalities effects on other banks. Bank IPOs can signal valuable

information about the future prospects for the banking industry. Since the value of a bank is partially dependent on the prospects for the entire industry, rival banks can experience valuation effects in response to an IPO announcement. The analysis of bank IPO announcements over the 1983-2000 period confirms favorable externalities effects on rival banks, as both state and regional rivals have positive and significant reactions for the overall sample of IPO announcements. However, regional differences in reactions are noted. Positive and significant reactions are present in two regions: Mid-Atlantic and Southwest region, while negative and significant reaction is present in Midwest region. These opposing effects may explain the overall insignificant reaction for the regional rivals' sample in response to IPO announcements during the 1997-2000 period, but they show that depending on the regional location of the announcing bank, IPO events convey information that has regional-wide implications. Thus, it is important noting the extent to which regional considerations influence the stock price reactions of non-announcing banks.

The variation in individual rival's reaction is explained both by rivals' characteristics and event-specific characteristics. Relatively larger rivals and those in highly concentrated markets experience a higher reaction than small size rivals and those that operate in low concentrated markets. The absence of competitive effects in low concentrated markets (high competition) can be explained by the fact that the IPO sample consists of small, community-based institutions that represent no threat for rival banks. The valuation effects are inversely related to prior rival's performance. Poor performing rival banks have more potential to enhance their own performance in response to more favorable industry prospects. Finally, an important factor that explains the variation in rivals' reaction is the IPO size. The evidence suggests that the higher the amount of IPO proceeds, the more information is conveyed to bank rivals.

Overall, the analysis suggests that bank IPO announcements transmit a signal about bank rivals, and the strength of the signal is not only influenced by event-specific characteristics, but also by rival bank specific-characteristics.

CHAPTER V

CONCLUSIONS AND POSSIBLE EXTENSIONS

In this dissertation I examine whether initial public offering announcements have externalities effects on similar publicly traded firms in industrial and banking sector. The evidence indicate that going public decisions generate positive externalities effects for both industrial and bank rivals. However, notable differences exist between the two sectors.

The evidence shows that industrial rivals experience positive and significant reaction in response to venture backed IPOs and no reaction in response to non-venture backed IPOs. This is consistent with the hypothesis that venture backed IPOs signal superior information about industry prospects and the information revealed has industry-wide implications. Rivals' characteristics play an important role in information transfer around IPO announcements. High market-to-book rivals have positive and significant valuation effects in response to venture backed IPOs whereas low market-to-book rivals have negative and significant valuation effects in response to non-venture backed IPO announcements. This implies that high market-to-book rivals have the ability to incorporate future growth opportunities available within an industry when this information is signaled at the filing date. On the other hand, low market-to-book rivals that operate in low concentrated industries may experience competitive disadvantages when a non-venture backed IPO firm enters in the market. With respect to size, small size rival portfolios show a higher reaction than that of large size rival portfolios. It suggests that small size rivals have the potential to gain more from the information revealed by a venture backed

IPO. Rivals in low concentrated industries that have low market-to-book ratio and are smaller in size experience negative reactions at the IPO announcements, regardless whether the IPOs are venture backed or not. However, the negative reaction has a higher magnitude in response to a non-venture backed IPO announcement. It can be concluded that both event and rivals' characteristics taken simultaneously can explain the variation in the information transfer.

One important factor that influences the direction and magnitude of rivals' valuation effects is the relative size of IPO firm. The evidence suggests that the larger the size of IPO firm relative to industry counterparts, the greater the impact on rivals. Rivals experience more positive wealth effects when a relatively larger firm goes public.

When a venture-backed IPO undergoes downward price revision at the offering date, it entails negative valuation consequence for rivals. However, the opposite does not hold when upward price revisions occur. It might be the case that they already incorporated the positive information generated by going public decisions at the filing date.

Bank IPOs generate higher externalities than industrial IPOs. Regardless of bank rivals' location (same state/region), they experience positive abnormal returns in response to an announcing IPO in the same state/region. This is consistent with Kohers (1999) who shows that the presence of regulation creates less diversity across banking firms and therefore, investors have higher propensity to react in response to public bank announcements. Within regional bank reaction, two regions experience a higher externality effect: Mid-Atlantic region and Southwest region. I interpret this result as rival banks having a higher opportunity to expand by acquiring a newly publicly traded bank in their region. This is consistent with the inter-state acquisition and consolidation activity after 1997 as a result of branching deregulation Act of 1994.

In chapter 4, the evidence shows that bank rivals have positive and significant reaction if they belong to highly concentrated states/regions. Coupled with the lack of competitive effects for low concentrated states/regions, one possible extension for the banking sector would be to further examine the externalities effects of IPO banking firms that are subsequently acquired by rival banks versus those that are not subsequently acquired. It might be the case that rival banks in highly concentrated markets react positively only when they view the newly formed bank as a potential target.

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APPENDIX A: Regulatory environment

Two important regulations have a direct impact on the analysis of bank initial public offerings' externalities on other banks: a) The Garn-St.Germain Depository Institutions Act of 1982; and b) The Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994.

a) *The Garn-St.Germain Depository Institutions Act of 1982*

According to this Act, thrift institutions are allowed to convert from mutual associations to stock charter institutions. Under this regulation, the conversion must involve a public sale of stock to depositors and management with an underwritten agreement. Conversion leads to major changes in voting rights, property rights and capital structure. Also, the regulation stipulates that a converting institution must sell all of its capital stock at market value, based on an independent valuation. The sale must be made by subscription through stock rights issued to eligible accountholders, with any unsubscribed stock sold through a public offering. The rights offering has two unusual features: first, non-transferable rights to purchase stock in newly formed institutions are distributed to depositors and management under a complicated priority system. Second, the offering price is unknown over the subscription period; only a price range of 15% around the independent appraiser's estimate of the net worth is specified. This is similar to bookbuilding phase for traditional IPOs, but the conversion process typically lasts for more than a year, whereas an average of two months is the normal process of bookbuilding.

As a result of the conversion process, the market value of the converting institution will most likely be altered due to: 1) equity capital inflow; 2) increasing the present value of thrift institution's cash flows from existing assets and current and future operations; 3) decreasing the market value of deposit insurance coverage; and 4) creating current and future conversion related

expenses. However, the most significant valuation effect of conversion is the increase in the net worth due to the sale of equity. This capital inflow alleviates the problem associated with equity capital shortages, enhancing potential growth and making the newly formed bank to compete more effectively with commercial banks. Theoretically, conversions are supposed to be a positive function of both potential growth and intensity of competition within each state. Masulis (1987) empirically examines this theoretical prediction and finds all the significant parameter estimates (i.e. percentage change in state-wide deposits of depository institutions, percentage change in state-wide depository institutions offices, percentage change in dollar value of S&L mortgage originations in the state, etc) consistent with the predictions of positive relationships between the likelihood of conversion and growth in demand and intensity of competition.

b) The Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994

Prior to the Riegle-Neal Act, the U.S. banking industry has followed a dual federal and state approach. In an effort to create parity among different institutions (branching) and provide new opportunities, federal regulators have passed different legislation, yet interstate branching were restricted to protect local markets.

The Riegle-Neal Act is a multi-component event. One component refers to "interstate banking" which allowed any bank holding company to acquire a bank anywhere in the U.S. The second component, "interstate branching", allowed bank holding companies to merge operations across state lines, turning out-of-state banks into interstate branches of the main bank. The Riegle-Neal Act allowed immediate intrastate branching and acquisitions across state lines one year later (1995) and consolidation of banks (in 1997) with the ability to opt in or out.

1) *Interstate acquisitions*: Any bank holding company was allowed to acquire a bank anywhere in the U.S. in September 1995. In acquiring out-of-state banks, bidders were allowed to take deposits and process transactions across state borders. This component of legislation overcomes the restrictive covenants in some states that allowed interstate banking only on a regional basis (the 30-miles rule). Several restrictions were imposed, for example acquisitions could be blocked if concentration ratios were greater than 10% (30%) of U.S. (state) deposits. Also, acquisitions were subject to reinvestment laws, in the sense that banks were required to lend at least 50% of the average for that state, otherwise it could face intervention.
2) *Interstate branching*: As of 1997, banks could merge operations across state lines, turning out-of-state banks into interstate branches of the main bank. Even though some states opted in early (1996), as of the end of 1997 all states had to decide to opt in or out, otherwise interstate branching in that state would be based on federal provisions.

As a result of regulations/deregulation in the U.S. banking industry over the last two decades, and the impact they have on individual bank valuation in response to public announcements, caution needs to be exercised when determining the bank rivals. As emerged from the discussion of the two most important Acts, banks can be considered rivals as following: for 1982-1996 period, any bank that operates within the same state as announcing bank; for 1997-2001 period, any bank that operates in the same region as announcing bank.

APPENDIX B: Distribution of rival banks

a) Distribution of rival banks by state (1983-1996 period)

State	No. of Rivals	Percent of Total	State	No. of Rivals	Percent of Total
AL	124	3.0	MT	5	0.10
AR	44	1.1	NC	206	5.00
AZ	6	0.1	ND	9	0.20
CA	280	6.8	NE	27	0.70
CO	22	0.5	NH	15	0.40
CT	158	3.8	NJ	125	3.00
DC	20	0.5	NM	6	0.10
DE	13	0.3	NV	2	0.00
FL	267	6.5	NY	229	5.50
GA	155	3.8	OH	228	5.50
HI	9	0.2	OK	17	0.40
IA	48	1.2	OR	5	0.10
ID	4	0.1	PA	171	4.10
IL	245	5.9	RI	5	0.10
IN	148	3.6	SC	68	1.60
KS	25	0.6	TN	108	2.60
KY	87	2.1	TX	53	1.30
LA	36	0.9	UT	15	0.40
MA	217	5.3	VA	186	4.50
MD	67	1.6	VT	10	0.20
ME	5	0.1	WA	23	0.60
MI	184	4.5	WI	99	2.40
MN	75	1.8	WV	54	1.30
MO	145	3.5	WY	5	0.10
MS	72	1.7			
Subtotal	2,456		Subtotal	1,671	
Total		4,127			

b) Distribution of rival banks by region (1997-2000 period)

Region	No. of Rivals	Percent of Total
Mid-Atlantic	132	6.0
Midwest	697	31.8
Southeast	878	40.1
Southwest	165	7.5
West	317	14.5
Total	2,189	100.0

VITA

Carmen Cotei was born in Sinaia, Romania in 1970. She received her Bachelor Degree in Finance and Banking from the Academy of Economic Studies in 1995. Prior to entering academia, Carmen held various business positions. She had worked as financial analyst and Chief of Securities Redemption Division for SAFI Mutual Fund from 1995 to 1997. In 1998, she joined INTRAROM, a multinational telecommunications company, as financial manager.

Carmen joined the Department of Economics and Finance as a doctoral student in August 2000. While studying for the Ph.D. in Financial Economics, she was a research and teaching assistant for Principles of Microeconomics. Her specialization is Corporate Finance and Investments.

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